

APPENDIX IV
AVOIDANCE & MINIMIZATION ANALYSIS

Avoidance & Minimization – Hartland Phase II

PROJECT PURPOSE AND NEED

The Applicant, Timber Ridge at Hartland, LLC, and their engineers propose to construct a one hundred and thirty-five (135) lot residential subdivision with associated roadways, two bridge crossings, utilities, and stormwater management facilities in Loudoun County, Virginia. The residential subdivision is being proposed to meet the increased demand for low-density cluster developments within the transitional areas of Loudoun County.

LEAST ENVIRONMENTALLY DAMAGING PRACTICABLE ALTERNATIVE DISCUSSION

Pursuant to the *Memorandum of Agreement between the Environmental Protection Agency and Department of the Army Concerning the Determination of Mitigation under the Clean Water Act Section 404(b)(1) Guidelines* and the Virginia Water Protection Permit regulations (9 VAC 25-210-90.C and 9 VAC 25-210-115), applicants for state permits to impact waters of the State must demonstrate that impacts to these waters have been avoided and minimized to the maximum extent practicable. Under the Section 404 (b)(1) Guidelines (40 CFR §§ 230.1-230.80) for non-water dependent uses, the applicant must demonstrate that the proposed project is the Least Environmentally Damaging Practicable Alternative (LEDPA) by demonstrating that all “appropriate and practicable” steps to avoid and minimize impacts on the project site have been taken.

The concept of practicability is an important component of the impact avoidance, minimization, and mitigation requirements of the U.S. Environmental Protection Agency (EPA), U.S. Army Corps of Engineers (COE), and Virginia Department of Environmental Quality (DEQ). The term “practicable” appears numerous times in the Virginia Water Protection Permit regulations, EPA’s Section 404(b)(1) Guidelines, and the *Memorandum of Agreement between the Environmental Protection Agency and Department of the Army Concerning the Determination of Mitigation under the Clean Water Act Section 404 (b)(1) Guidelines*. This term is defined identically in the Virginia Water Protection Permit regulation (9 VAC 25-210-10) and EPA’s Section 404 (b)(1) Guidelines (40 CFR §§ 230.1-230.80) as “available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes.” The COE’s wetlands regulations (33 CFR §§ 320-331) also recognized economic issues as one of the criteria to be considered in determining whether the COE should issue a permit, and these regulations state that the practicability of alternatives to accomplish the objective of the proposed project must be considered in permit decisions (33 CFR § 320.4(a)(1)). Thus, economic interests and the purpose of a proposed project may be taken into account when analyzing project alternatives and determining the Least Environmentally Damaging Practicable Alternative (LEDPA).

In order for the project purpose to be practicably achieved, the wetlands and streams must be impacted to allow for the construction of project to meet the project purpose. Given the location of the project site and because the amount of fill located in jurisdictional wetlands and streams has been limited to the minimum necessary to accomplish these requirements, there is no practicable alternative that will allow for the construction of this development within the project boundary with less adverse effects of streams, wetlands, and the aquatic community while accomplishing project goals and purpose other than the selected alternative depicted.

ONSITE ALTERNATIVE ANALYSIS

The Applicant, land planners and engineers have worked to avoid and minimize impacts on the site to the maximum extent practicable. As such, the limits of disturbance associated with the proposed impacts will be limited to the minimum area required to safely construct the northern and southern bridge crossings, install water and sanitary sewer lines to tie into the existing offsite water and sanitary sewer easements, construct a stormwater management pond and to install roadways to provide access to and within the development. The layout of the proposed development was placed in the only location feasible to suit the proposed usage. Due to the size of the project area and development constraints, no viable alternatives exist for the planned development. The Applicant has considerable investment in the project in its current configuration and has taken great care to avoid any impacts to aquatic resources with the residential development footprint.

The overall project was discussed with DEQ and the USACE during a pre-application meeting. The overall Hartland development includes nearly 1,000 residential units upon total build-out. The scale and magnitude and capital outlay of the proposed project does not allow for final engineering to be completed for the remaining sections of Hartland at this time.

SITE CONSTRAINTS

Numerous utility easements and setback requirements exist onsite, which significantly constrain the overall developable area. Moreover, the site is bisected by Broad Run and Lenah Run, which source the FEMA floodplain located onsite. Due to the amount of floodplain onsite, the potential development footprint is limited, as development within in the floodplain is not permissible per Loudoun County.

ENTRANCE RELOCATION

Entrance siting's cannot be relocated as access to this portion of the proposed development is pre-determined by road construction currently underway on portions of land associated with Hartland Phase I Permit (WP4-19-1583), which includes Hartland Drive and Mayfield Meadow Drive, both of which tie into existing Fleetwood Road.

BRIDGE CONSTRUCTION

Two bridge crossings are proposed as part of this permit application. The northern bridge crossing will provide access to the northern portion of the Hartland development, over Broad Run. The southern bridge crossing will provide access to the southern and western portions of the Hartland development, over Lenah Run. Additional information, including approved plan details, cross sections and sequence of

construction are located in Appendix X. The applicant has elected to utilize bridge crossings, in spite of their cost, in an effort to minimize impacts to wetlands and Waters.

STORMWATER MANAGEMENT

The engineers involved with this project have made efforts to design the proposed stormwater management facilities to provide minimal impact to the environmental features onsite, while improving the quality and velocity of stormwater leaving the site. The stormwater pond F-5 is designed to be the minimum footprint necessary to support the southern portion of the project site, while still meeting the water quality and quantity requirements of the state. The proposed stormwater management facilities have been placed at the lowest portion of the site to allow them to be gravity fed and to maximize the efficiency of the systems. Additionally, low flow and diversions have been utilized to provide hydrology to receiving streams.

NO-BUILD ALTERNATIVE ANALYSIS

Development of the existing site, consistent with available infrastructure and services is a reasonably expected occurrence in the foreseeable future, even if the project were not approved. As such, although no impacts would occur to wetlands or WOTUS for the No-Build Alternative, it is reasonable to project future development on site. In such case, as the approved plans has already limited, to the best extent possible, the amount of fill to be located in the jurisdictional streams and wetlands, it is unlikely that any future proposed development will allow for less adverse effects on streams, wetlands, and the aquatic community than the proposed project. Further, the no-build alternative for this project would result in a significant loss of revenue for the applicant, rendering the project infeasible.

ONSITE ALTERNATIVE ANALYSIS

Previous preliminary development plans called for additional wetland and stream impacts; however, these plans were discarded based on their encroachment into wetlands and Waters of the U.S. In addition to the impacts currently proposed, the former layout included additional permanent impacts to PFO wetlands for the sewer and reuse water line installation. These impacts have been avoided by shifting the proposed lines away from wetlands. Further, low flow and diversions have been utilized so not to dewater sections of stream so they may continue to function.

SUMMARY OF ALTERNATIVES

Based on a review of both on and offsite alternatives, the Preferred Plan represents the Least Environmentally Damaging Practicable Alternative (LEDPA) as detailed below.

IMPACTS TO WETLANDS & WATERS OF THE U.S. DISCUSSION

The proposed impacts consist of general site grading for the construction of roadways, bridge crossings, a stormwater management facility and sanitary sewer and watermain line installations, which are all necessary to serve the proposed usage. There are twelve (12) permanent and temporary impact areas.

Impacts 1-14 are associated with the Hartland Phase I permit, which are shown on the "Overall Impact Map for Waters of the U.S." enclosed within this permit application.

Impact #15, which is permanent, will result from filling 0.33-acres (14,252-square feet) of palustrine forested (PFO) wetland, of which 0.17-acres (7,410-square feet) is considered a permanent conversion, and 78 linear feet (0.009 acres) of perennial stream associated with bridge and pier construction across Broad Run. The permanent impacts proposed in this area due to the grading and placement of fill material. This impact is necessary in order to accomplish project goals and to access to the southern portion of the proposed development. In addition, 31 linear feet (0.02 acres) of perennial stream will be temporarily impacted in order to install a water line. This area will be returned to pre-construction contours once the utility has been installed.

Impact #16, which is temporary, will result from cutting 78 linear feet (0.02 acres) of perennial stream in order to install two water lines. Both affected areas will be returned to pre-construction contours once the utilities have been installed.

Impact #17, which is permanent, will result from filling 0.06 acres (2,705-square feet) of palustrine forested (PFO) wetland associated with the construction of the southern bridge across Lenah Run. The permanent impacts proposed in this area due to the grading and placement of fill material for the proposed bridge. This impact is necessary in order to accomplish project goals and to provide access to the southern portion of the proposed development.

Impact #18, which is permanent, will result from filling 0.01-acres (325-square feet) of palustrine forested (PFO) wetland and 96 linear feet (0.01 acres) of intermittent stream associated with the construction of Hartland Drive. The permanent impacts proposed in this area due to the grading and placement of fill material for the construction of the main access road to the southern portion of the proposed development.

Impact #19, which is permanent, will result from filling 0.27-acres (11,552-square feet) of palustrine forested (PFO) wetland and 296 linear feet (0.04 acres) of intermittent stream associated with the installation of stormwater pond F-5 and the construction of Hartland Drive. The permanent impacts proposed in this area due to the grading and placement of fill material for the construction of the main access road to the southern portion of the proposed development, as well as to provide adequate stormwater for this portion of the site.

Impact #20, which is temporary, will result from cutting 35 linear feet (0.01 acres) of perennial stream in order to install a sanitary sewer line. This area will be returned to pre-construction contours once the utility has been installed.

Impact #21, which is permanent, will result from filling 0.02-acres (949-square feet) of palustrine forested (PFO) wetland, 0.03-acres (1,337-square feet) of palustrine emergent (PEM) wetland and 87 linear feet (0.01 acres) of ephemeral stream associated with the construction of Mayfield Meadow Drive. The permanent impacts proposed in this area due to the grading and placement of fill material to provide road access from Hartland Phase I to Hartland Phase II.

Impact #22, which is temporary, will result from cutting 35 linear feet (0.01 acres) of intermittent stream in order to install a pedestrian foot bridge. This area will be returned to pre-construction contours once the utility has been installed.

Impact #23, which is temporary, will result from cutting 42 linear feet (0.01 acres) of intermittent stream in order to install two sanitary sewer lines. These areas will be returned to pre-construction contours once the utility lines have been installed.

Impact #24, which is temporary, will result from cutting 33 linear feet (0.01 acres) of perennial stream in order to install a sanitary sewer line. This area will be returned to pre-construction contours once the utility has been installed.

Impact #25, which is temporary, will result from cutting 41 linear feet (0.02 acres) of perennial stream in order to install a water line. The affected area will be returned to pre-construction contours once the utility has been installed.

Impact #26, which is permanent, will result from filling 0.02-acres (769-square feet) of palustrine emergent (PEM) wetland, 89 linear feet (0.01 acres) of intermittent stream and 66 linear feet (0.01 acres) of ephemeral stream associated with the installation of an outfall for stormwater pond F-3 and the construction of Mayfield Meadow Drive. The permanent impacts proposed in this area due to the grading and placement of fill material for the construction of the road and to provide adequate stormwater management in this area.

Due to the location and extent of streams and wetlands onsite, the permanent impacts to 78-linear feet (0.01-acres) of perennial stream, 481-linear feet (0.06-acres) of intermittent stream, 153-linear feet (0.02-acres) of ephemeral stream, 0.68-acres (29,783-square feet) of palustrine forested wetland (PFO) and 0.05-acres (2,106-square feet) of palustrine emergent wetland (PEM) proposed in this JPA are unavoidable. In addition, 185-linear feet (0.07-acres) of perennial stream and 110-linear feet (0.03- acres) of intermittent stream will be temporarily impacted.

CONCLUSION

In pursuing the proposed project site, the Applicant has implemented all practicable efforts to minimize unavoidable impacts to jurisdictional areas. The Applicant, land planners and engineers have been diligent in their attempts to avoid and minimize impacts on the site to the maximum extent reasonably practicable. Due to the size of the project area and the significant development constraints, no practicable alternatives exist for the planned development.

APPENDIX V
CONCEPTUAL MITIGATION PLAN

Conceptual Mitigation Plan

The Applicant proposes to make payment to a U.S. Army Corps of Engineers and Virginia Department of Environmental Quality approved wetland mitigation bank to compensate for the impacts to 0.33-acres (14,252-square feet) of palustrine forested (PFO) wetland, of which 0.17-acres (7,410-square feet) is considered a permanent conversion, and 0.05-acres (2,106-square feet) of palustrine emergent wetland (PEM).

Wetland Compensation Requirements

Cowardin Classification	Impact (Acres)	Compensation Ratio	Compensation Requirement (credits)
PFO	0.51	2:1	1.02
PEM	0.05	1:1	0.05
PFO Conversion	0.17	1:1	0.17
Total	0.73		1.24

The proposed project will result in permanent impacts 78-linear feet (0.01-acres) of perennial stream, 481-linear feet (0.06-acres) of intermittent stream, and 153-linear feet (0.02-acres) of ephemeral stream. These impacts will be mitigated with the purchase of credits from an approved stream bank, if credits are available.

Stream Compensation Requirements

Impact Number/Reach ID	Cowardin Classification	Impact (Linear feet)	Reach Condition Index (from USM Forms, attached)	Compensation Requirement (credits)
5	R3	78	1.12	87
6	R4	96	1.02	98
7	R4	296	1.03	305
8	RE	87	0.57	50
9	RE	66	0.72	48
10	R4	89	1.18	105
	Total	712		693

The Applicant proposes to compensate for the permanent impacts through the purchase of 693 credits from a U.S. Army Corps of Engineers and Virginia Department of Environmental Quality approved stream mitigation bank prior to the commencement of construction to offset the loss of 78-linear feet (0.01-acres) of perennial stream, 481-linear feet (0.06-acres) of intermittent stream, and 153-linear feet (0.02-acres) of ephemeral stream.

It is the opinion of TNT that there will be no net loss of functions and values and the proposed mitigation will fully compensate for the impacts to wetlands and Waters of the U.S. proposed in this JPA.

Stream Assessment Form (Form 1)

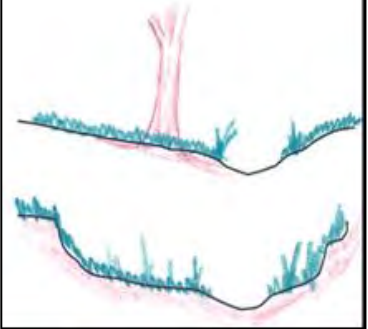
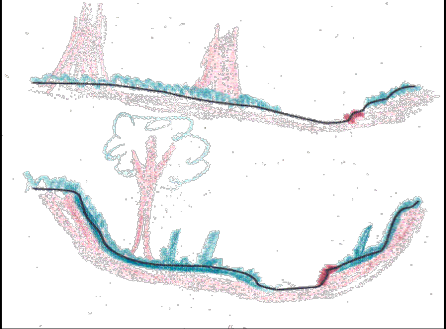
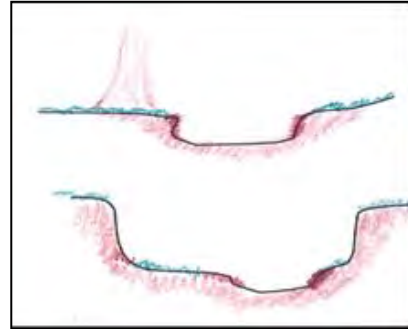
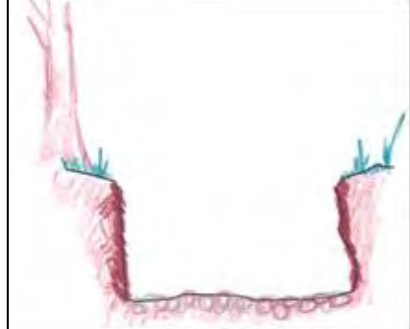

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
1460-F1	Hartland Phase II	Loudoun	R3	02070008	8/24/20	5	78	1

Name(s) of Evaluator(s)	Stream Name and Information
A.Sareen, S.Swartzendruber	Broad Run

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Conditional Category					
	Optimal	Suboptimal	Marginal	Poor	Severe
Channel Condition					
	<p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	<p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	<p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute to instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	<p>Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	<p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>
Score	3	2.4	2	1.6	1

CI

1.6

NOTES>>

Erosion on approximately 60-80% of the reach's banks observed. Some areas with undercut banks observed

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Conditional Category								NOTES>> Right bank consists of suboptimal tree cover and non-maintained farm field. Left bank consists of suboptimal tree cover and non-maintained farm field.
Riparian Buffers	Optimal	Suboptimal		Marginal		Poor		
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

NOTES>> Right bank consists of suboptimal tree cover and non-maintained farm field. Left bank consists of suboptimal tree cover and non-maintained farm field.

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	15%	85%					100%
	Score >	1.2	0.75					

$$CI = (\text{Sum \% RA} * \text{Scores} * 0.01) / 2$$

Left Bank	% Riparian Area>	85%	15%					100%	Rt Bank CI >	0.82
	Score >	1.2	0.75						Lt Bank CI >	1.13

Rt Bank CI >	0.82
Lt Bank CI >	1.13

CI

0.98

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercurrents; root mats; SAV; riffle poole complexes, stable features.

NOTES>> Woody and leafy debris, shade, undercut banks and SAV observed throughout reach.

Instream Habitat/ Available Cover	Conditional Category			
	Optimal	Suboptimal	Marginal	Poor
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.
Score	1.5	1.2	0.9	0.5

CI

1.50

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
1460-F1	Hartland Phase II	Loudoun	R3	02070008	8/24/20	SAR #5	78	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock							NOTES>> Channel alterations were not observed.
Channel Alteration	Conditional Category						
	Negligible	Minor		Moderate		Severe	
	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.	
	SCORE	1.5	1.3	1.1	0.9	0.7	
REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH							
NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.					THE REACH CONDITION INDEX (RCI) >>		

INSERT PHOTOS:



Downstream view

Upstream view



DESCRIBE PROPOSED IMPACT:

Pier installation for northern bridge crossing.

Stream Assessment Form (Form 1)

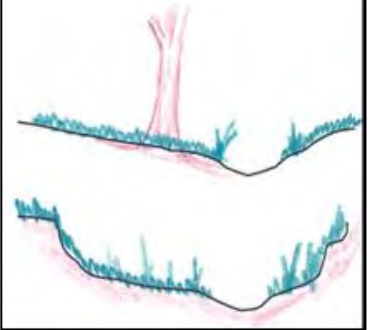
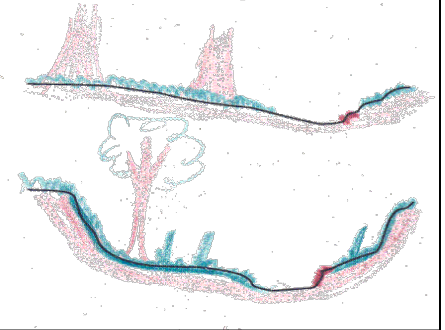
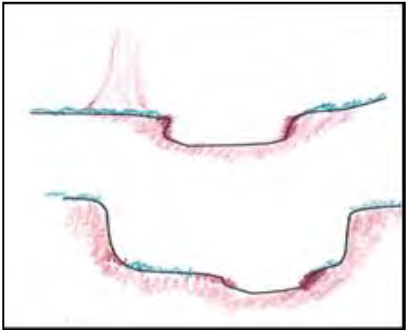
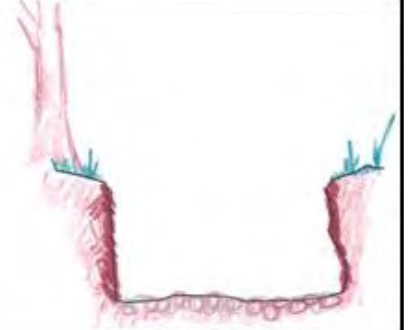

Unified Stream Methodology for use in Virginia

For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
1460-F1	Hartland Phase II	Loudoun	R4	02070008	8/24/20	6	96	1

Name(s) of Evaluator(s)	Stream Name and Information
A.Sareen, S. Swartzendruber	Unnamed Tributary to Broad Run

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Channel Condition					
	Optimal	Suboptimal	Marginal	Poor	Severe
	 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute to stability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>
	3	2.4	2	1.6	1

C

2.0

NOTES>>

Partially incised stream with vegetative cover on 60% of banks. Erosion visible on 50% of stream banks

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Conditional Category								NOTES>> Both stream banks consist of suboptimal forest cover and actively grazed pasture.
Riparian Buffers	Optimal	Suboptimal		Marginal		Poor		
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
		High	Low	High	Low	High	Low	
	Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	

NOTES>> Both stream banks consist of suboptimal forest cover and actively grazed pasture.

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums of % Riparian Blocks equal 100

Right Bank	% Riparian Area>	25%	75%					100%
	Score >	1.2	0.6					

$$CI = (\text{Sum \% RA} * \text{Scores} * 0.01) / 2$$

Left Bank	% Riparian Area>	10%	90%					100%	Rt Bank CI >	0.75
	Score >	1.2	0.6						Lt Bank CI >	0.66

Rt Bank C

It Bank C

C

7

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; underbanks; root mats; SAV; riffle poole complexes, stable features.

NOTES>> Instream habitat including undercut banks, woody and leafy debris and varied substrate sizes were observed.

Instream Habitat/ Available Cover	Conditional Category				undercut banks, woody and leafy debris and varied substrate sizes were observed.
	Optimal	Suboptimal	Marginal	Poor	
	Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.	Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.	Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	
Score	1.5	1.2	0.9	0.5	

C

.9

Stream Impact Assessment Form Page 2

Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
1460-F1	Hartland Phase II	Loudoun	R4	02070008	8/24/20	SAR #6	96	1

4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock

NOTES>>

Channel Alteration	Conditional Category					
	Negligible	Minor		Moderate		Severe
	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.
SCORE	1.5	1.3	1.1	0.9	0.7	0.5

1.50

REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.

THE REACH CONDITION INDEX (RCI) >> 1.02

RCI= (Sum of all CI's)/5

COMPENSATION REQUIREMENT (CR) >> 98

CR = RCI X LF X IF

INSERT PHOTOS:



Upstream view

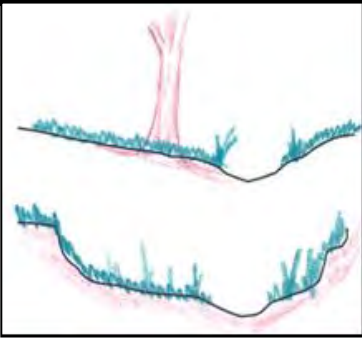
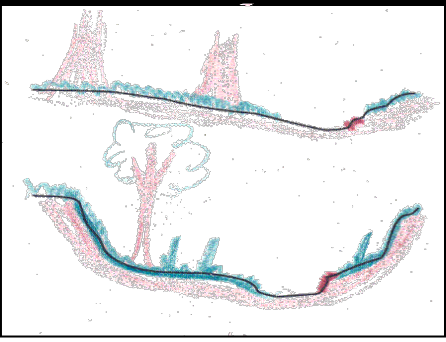
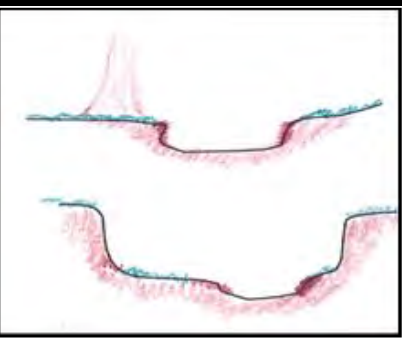
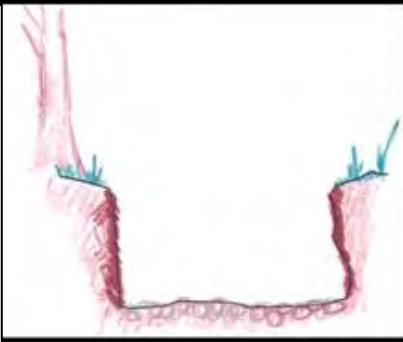

DESCRIBE PROPOSED IMPACT:

Grading associated with the installation of Hartland Drive.

Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia

For use in Wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor		
1460-F1	Hartland Phase II	Loudoun	R4	02070008	8/24/20	7	296	1		
Name(s) of Evaluator(s)		Stream Name and Information								
A.Sareen, S. Swartzendruber		Unnamed Tributary to Lenah Run								
1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)										
Conditional Category										
Channel Condition	Optimal	Suboptimal		Marginal		Poor		Severe		
	 Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.	 Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.		 Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute instability. Deposition that contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.		 Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.		 Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.		
Score	3	2.4		2		1.6		1		
NOTES>>	Partially incised stream with vegetative cover on 60% of banks. Erosion visible on 50% of stream banks.									
2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)										
Conditional Category										
Riparian Buffers	Optimal	Suboptimal		Marginal		Poor		NOTES>> Both stream banks consist of suboptimal forest cover and actively grazed pasture.		
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory. Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.			
			High	Low	High	Low	High		Low	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5			
1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.						Ensure the sums				
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.						of % Riparian				
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.						Blocks equal 100				
Right Bank	% Riparian Area>	25%	75%					100%		
	Score >	1.2	0.6							
								CI= (Sum % RA * Scores*0.01)/2		
Left Bank	% Riparian Area>	25%	75%					100%		
	Score >	1.2	0.6							
								Rt Bank CI >	0.75	CI
								Lt Bank CI >	0.75	0.75
3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddedness; shade; undercut banks; root mats; SAV; riffle poole complexes, stable features.										
Instream Habitat/ Available Cover	Conditional Category									
	Optimal	Suboptimal		Marginal		Poor		NOTES>> Instream habitat including undercut banks, woody and leafy debris and varied substrate sizes were observed in approximately 10-30% of the reach.		
Habitat elements are typically present in greater than 50% of the reach.	Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations.		Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations.		Habitat elements listed above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.					
Score	1.5	1.2		0.9		0.5		CI		
								0.90		

Stream Impact Assessment Form Page 2									
Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor	
1460-F1	Hartland Phase II	Loudoun	R4	02070008	8/24/20	SAR #7	296	1	
4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock							NOTES>>		
Channel Alteration	Conditional Category								
	Negligible	Minor		Moderate		Severe			
	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.			
	SCORE	1.5	1.3	1.1	0.9	0.7			0.5
REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH								1.50	
NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.								THE REACH CONDITION INDEX (RCI) >>	1.03
								RCI= (Sum of all CI's)/5	
								COMPENSATION REQUIREMENT (CR) >>	305
								CR = RCI X LF X IF	

INSERT PHOTOS:



Downstream view

DESCRIBE PROPOSED IMPACT:

Grading associated with the construction of stormwater pond F-5.
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Ephemeral Stream Assessment Form (Form 1a)

Unified Stream Methodology for use in Virginia

For use in ephemeral streams

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
1460-F1	Hartland Phase II	Loudoun	RE	02070008	8/24/20	8	87	1

Name(s) of Evaluator(s)	Stream Name and Information
A.Sareen, S.Swartzendruber	Unnamed tributary to Lenah Run

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Conditional Category								NOTES>> The right bank consists of hardwood forest, while the left bank consists of fallow field.
Riparian Buffers	Optimal	Suboptimal		Marginal		Poor		
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and an non-maintained understory. Wetlands areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with >30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	
			High	Low	High	Low	High	
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5	

NOTES>> The right bank consists of hardwood forest, while the left bank consists of fallow field.

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.							Ensure the sums	
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.							of % Riparian	
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.							Blocks equal 100	
Right Bank	% Riparian Area>	100%						100%
	Score >	1.5						

$$CI = (\text{Sum \% RA} * \text{Scores} * 0.01) / 2$$

Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.50
	Score >	0.75							Lt Bank CI >	0.75

Lt Bank CI >	0.75
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REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.

THE REACH CONDITION INDEX (RCI) >>	0.57
RCI= (Riparian CI)/2	
COMPENSATION REQUIREMENT (CR) >>	50

$$CR = RCI \times LF \times IF$$

INSERT PHOTOS:



Upstream View

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DESCRIBE PROPOSED IMPACT:

<p>Secondary permanent impact due to loss of hydrology from impacts to upgradient wetland.</p>

Ephemeral Stream Assessment Form (Form 1a)

Unified Stream Methodology for use in Virginia

For use in ephemeral streams

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
1460-F1	Hartland Phase II	Loudoun	RE	02070008	8/24/20	9	66	1

Name(s) of Evaluator(s)	Stream Name and Information
A.Sareen, S.Swartzendruber	Unnamed tributary to Lenah Run

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Conditional Category								NOTES>> The right bank consists of hardwood forest, while the left bank consists of fallow field.		
Riparian Buffers	Optimal		Suboptimal		Marginal		Poor			
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and an non-maintained understory . Wetlands areas.		High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with >30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.			Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.
					High	Low	High			Low
Condition Scores	1.5		1.2	1.1	0.85	0.75	0.6	0.5		
1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.								Ensure the sums		
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.								of % Riparian		
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.								Blocks equal 100		
Right Bank	% Riparian Area>	100%						100%		
	Score >	1.5								
									CI= (Sum % RA * Scores*0.01)/2	
Left Bank	% Riparian Area>	80%	20%					100%	Rt Bank CI >	1.50
	Score >	1.5	0.75						Lt Bank CI >	1.35

NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.

THE REACH CONDITION INDEX (RCI) >>	0.72
------------------------------------	------

$$RCI = (Riparian\ CI)/2$$

COMPENSATION REQUIREMENT (CR) >>	48
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$$CR = RCI \times LF \times IF$$

INSERT PHOTOS:



Upstream View

DESCRIBE PROPOSED IMPACT:

Construction of Mayfield Meadow Drive

Stream Assessment Form (Form 1)

Unified Stream Methodology for use in Virginia


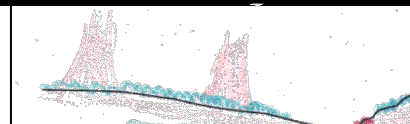



For use in wadeable channels classified as intermittent or perennial

Project #	Project Name	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length	Impact Factor
1460-F1	Hartland Phase II	Loudoun	R4	02070008	8/24/20	10	89	1

Name(s) of Evaluator(s)	Stream Name and Information
A.Sareen, S. Swartzendruber	Unnamed Tributary to Lenah Run

1. Channel Condition: Assess the cross-section of the stream and prevailing condition (erosion, aggradation)

Conditional Category

Channel Condition	Optimal	Suboptimal	Marginal	Poor	Severe
	 <p>Very little incision or active erosion; 80-100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom.</p>	 <p>Slightly incised, few areas of active erosion or unprotected banks. Majority of banks are stable (60-80%). Vegetative protection or natural rock prominent (60-80%) AND/OR Depositional features contribute to stability. The bankfull and low flow channels are well defined. Stream likely has access to bankfull benches, or newly developed floodplains along portions of the reach. Transient sediment covers 10-40% of the stream bottom.</p>	 <p>Often incised, but less than Severe or Poor. Banks more stable than Severe or Poor due to lower bank slopes. Erosion may be present on 40-60% of both banks. Vegetative protection on 40-60% of banks. Streambanks may be vertical or undercut. AND/OR 40-60% of stream is covered by sediment. Sediment may be temporary/transient, contribute to stability, may be forming/present. AND/OR V-shaped channels have vegetative protection on > 40% of the banks and depositional features which contribute to stability.</p>	 <p>Overwidened/incised. Vertically/laterally unstable. Likely to widen further. Majority of both banks are near vertical. Erosion present on 60-80% of banks. Vegetative protection present on 20-40% of banks, and is insufficient to prevent erosion. AND/OR 60-80% of the stream is covered by sediment. Sediment is temporary/transient in nature, and contributing to instability. AND/OR V-shaped channels have vegetative protection is present on > 40% of the banks and stable sediment deposition is absent.</p>	 <p>Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average rooting depth, majority of banks vertical/undercut. Vegetative protection present on less than 20% of banks, is not preventing erosion. Obvious bank sloughing present. Erosion/raw banks on 80-100%. AND/OR Aggrading channel. Greater than 80% of stream bed is covered by deposition, contributing to instability. Multiple thread channels and/or subterranean flow.</p>
Score	3	2.4	2	1.6	1

CI

2.0

NOTES>>

Partially incised stream with vegetative cover on 60% of banks. Erosion visible on 50% of stream banks.

2. RIPARIAN BUFFERS: Assess both bank's 100 foot riparian areas along the entire SAR. (rough measurements of length & width may be acceptable)

Conditional Category

Riparian Buffers	Optimal	Suboptimal		Marginal		Poor	
	Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover and a non-maintained understory . Wetlands located within the riparian areas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with > 30% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.
			High	Low	High	Low	High
Condition Scores	1.5	1.2	1.1	0.85	0.75	0.6	0.5

banks consist of suboptimal forest cover and actively grazed pasture.

NOTES>> Both stream banks consist of suboptimal forest cover and actively grazed pasture.

1. Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors.
2. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below.
3. Enter the % Riparian Area and Score for each riparian category in the blocks below.

Ensure the sums
of % Riparian
Blocks equal 100

Right Bank	% Riparian Area>	100%						100%
	Score >	1.5						

$$CI = (\text{Sum \% RA} * \text{Scores} * 0.01) / 2$$

Left Bank	% Riparian Area>	100%						100%	Rt Bank CI >	1.50
	Score >	1.5							Lt Bank CI >	1.50

Rt Bank Cl >

Lt Bank Cl >

3. INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut banks; root mats; SAV; riffle pool complexes, stable features.

NOTES>> Instream habitat including undercut banks, woody and leafy debris and varied substrate sizes were observed in approximately 10-30% of the reach.

CI

0.90

Stream Impact Assessment Form Page 2								
Project #	Applicant	Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
1460-F1	Hartland Phase II	Loudoun	R4	02070008	8/24/20	SAR #10	89	1
4. CHANNEL ALTERATION: Stream crossings, riprap, concrete, gabions, or concrete blocks, straightening of channel, channelization, embankments, spoil piles, constrictions, livestock							NOTES>>	
Channel Alteration	Conditional Category							
	Negligible	Minor		Moderate		Severe		
	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines AND/OR 80% of banks shored with gabion, riprap, or cement.		
	SCORE	1.5	1.3	1.1	0.9	0.7		
REACH CONDITION INDEX and STREAM CONDITION UNITS FOR THIS REACH								1.50
NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.						THE REACH CONDITION INDEX (RCI) >>		1.18
						RCI= (Sum of all CI's)/5		
						COMPENSATION REQUIREMENT (CR) >>		105
						CR = RCI X LF X IF		

INSERT PHOTOS:



DESCRIBE PROPOSED IMPACT:

Grading associated with the installation of road access to stormwater management pond F-3.

Notice: The credit totals shown do NOT reflect any credit reservations or pending transactions. It is the responsibility of potential purchasers to contact the Sponsor and obtain written confirmation of credit availability.

Latitude: 38.965559017200384, Longitude -77.5778059310702

State: Virginia

County: Loudoun

8-digit Hydrologic Unit Code: 02070008

USFWS Field Office: Virginia

USACE District: Norfolk

NOAA Region: Northeast

Mitigation/Conservation Banks & ILF Sites in Primary Service Area 8

Mitigation/Conservation Banks & ILF Sites in Secondary Service Area 0

Mitigation/Conservation Banks & ILF Sites in Tertiary Service Area	0
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ILF Program Advance Credits	1
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Search Criteria:

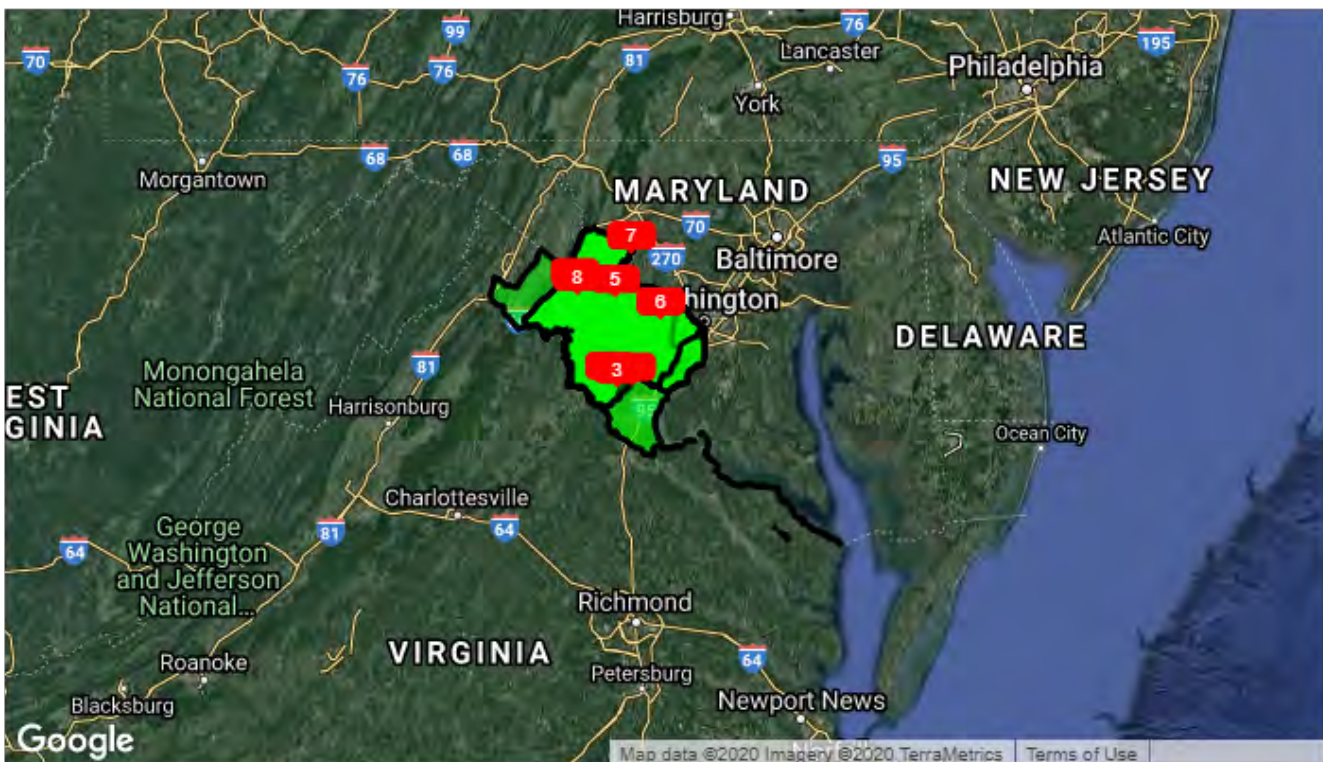
excluding single client banks and ILF sites

including banks and ILF sites with habitat of **Non-Tidal Wetlands, Riverine, Wetlands**

excluding banks, ILF sites and ILF programs with zero available credits

including bank and ILF site service areas of rank Primary, Secondary, Tertiary

Mitigation/Conservation Banks & ILF Sites in Primary Service Area



Bank Name: 1 - Cedar Run

Bank Type: Private Commercial

Total Acres: 743.52

Distance to impact: 22 Miles

Permit No: NAO-1999-0215

Bank States: Virginia

Comments: Wetland mitigation bank utilizing compensatory mitigation ratio

Bank Sponsor: **Cedar Run Wetlands, LC**
c/o Wetland Studies & Solutions, Inc.
5300 Wellington Branch Drive, Suite 100
Gainesville, VA

Bank POC: **Jennifer Van Houten**
Principal Environmental Scientist
5300 Wellington Branch Drive, Suite 100
Gainesville, VA 20155
Email: jvanhouten@wetlandstudies.com
Phone: (703) 679-5641
Cell Phone: (703) 615-2462
Fax: (703) 679-5601

Bank Manager: **Ron Stouffer, Jr.**
Environmental Scientist
18139 Triangle Shopping Plaza Ste 213
Dumfries, VA 22026
Email: Ron.H.Stouffer@usace.army.mil
Phone: (757) 201-7124

<u>Credit Type</u>	<u>Credit Classifications</u>	<u>Assessment Method</u>	<u>Available Credits</u>	<u>Jurisdiction</u>
Wetland	POW - Palustrine Open Water	Ratio	0.00	Federal
Wetland	Wetlands	Ratio	0.90	Federal

Notes:

Bank Name: 2 - Foggy Bottom Phase I

Bank Type: Private Commercial

Total Acres: 28.74

Distance to impact: 23 Miles

Permit No: NAO-2002-0336

Bank States: Virginia

Comments: Wetland and stream mitigation bank utilizing the compensatory mitigation ratio method (wetlands) and Unified Stream Methodology (USM) to assess credits

Bank Sponsor: **Foggy Bottom LLC,**
c/o Virginia Waters & Wetlands, Inc.
6799 Kennedy Rd, Suite A
Warrenton, VA 20186

Bank POC: **Joe Ivers**
Ph.D./President
6799-A Kennedy Road
Warrenton, VA 20186
Email: joeivers@vawaters.com
Phone: (540) 349-1522
Fax: (540) 349-1577

Bank Manager: **Ron Stouffer, Jr.**
Environmental Scientist
18139 Triangle Shopping Plaza Ste 213
Dumfries, VA 22026
Email: Ron.H.Stouffer@usace.army.mil
Phone: (757) 201-7124

<u>Credit Type</u>	<u>Credit Classifications</u>	<u>Assessment Method</u>	<u>Available Credits</u>	<u>Jurisdiction</u>
Stream	Riverine	Unified Stream Methodology	350.00	Federal
Wetland	Wetlands	Ratio	0.00	Federal

Notes:

Bank Name: 3 - Foggy Bottom Phase II

Bank Type: Private Commercial

Total Acres: 65

Distance to impact: 23 Miles

Permit No: NAO-2006-7460

Bank States: Virginia

Comments: A wetland mitigation bank that utilizes the Compensatory Ratio Method to assess mitigation credits

Bank Sponsor: **Foggy Bottom LLC,**
c/o Virginia Waters & Wetlands, Inc.
6799 Kennedy Rd, Suite A
Warrenton, VA 20186

Bank POC: **Erik Allen**
Watershed Consulting PLLC
15B North Thompson Street
Richmond, VA 23221
Email: Erik@watershedva.com
Phone: (804) 304-4659

Joe Ivers
Ph.D./President
6799-A Kennedy Road
Warrenton, VA 20186
Email: joeivers@vawaters.com
Phone: (540) 349-1522
Fax: (540) 349-1577

Bank Manager: **Ron Stouffer, Jr.**
Environmental Scientist
18139 Triangle Shopping Plaza Ste 213
Dumfries, VA 22026
Email: Ron.H.Stouffer@usace.army.mil
Phone: (757) 201-7124

<u>Credit Type</u>	<u>Credit Classifications</u>	<u>Assessment Method</u>	<u>Available Credits</u>	<u>Jurisdiction</u>
Wetland	Wetlands	Ratio	7.90	Federal

Notes:

Bank Name: 4 - Grasslands

Bank Type: Private Commercial

Total Acres: 90

Distance to impact: 16 Miles

Permit No: NAO-2008-0561

Bank States: Virginia

Comments: Proposed wetland and stream mitigation bank. Credits would be assessed using the mitigation ratio method (wetlands) & Unified Stream Methodology (USM)

Bank Sponsor: **Virginia Wetland Credits LLC**
9841 Washingtonian Boulevard, Suite 300
Gaithersburg, MD 20878
Phone: (301) 548-4670

Bank POC: **Russ Gestl**
9841 Washingtonian Boulevard, Suite 300
Gaithersburg, MD 20878
Phone: (301) 548-4670

Gary Jellick
Acorn Environmental
708 Laurel Lane
Severna Park, MD 21146
Email: jellick-acorn@comcast.net
Phone: (410) 729-1470
Cell Phone: (410) 274-0622

Jennifer Van Houten
Principal Environmental Scientist
5300 Wellington Branch Drive, Suite 100
Gainesville, VA 20155
Email: jvanhouten@wetlandstudies.com
Phone: (703) 679-5641
Cell Phone: (703) 615-2462
Fax: (703) 679-5601

Bank Manager: **Ron Stouffer, Jr.**
Environmental Scientist
18139 Triangle Shopping Plaza Ste 213
Dumfries, VA 22026
Email: Ron.H.Stouffer@usace.army.mil
Phone: (757) 201-7124

<u>Credit Type</u>	<u>Credit Classifications</u>	<u>Assessment Method</u>	<u>Available Credits</u>	<u>Jurisdiction</u>
Stream	Riverine	Unified Stream Methodology	0.00	Federal
Wetland	Wetlands	Ratio	2.63	Federal

Notes:

Bank Name: 5 - Loudoun County

Bank Type: Private Commercial

Total Acres: 35.75

Distance to impact: 5 Miles

Permit No: NAO-2007-2691

Bank States: Virginia

Comments: Wetland and stream mitigation bank. Wetland credits are assessed by compensatory mitigation ratio. Stream credits are assessed by Unified Stream Methodology

Bank Sponsor: **Loudoun County Wetlands and Stream Restoration, LC**
c/o Wetland Studies & Solutions, Inc.
14088 M Sullyfield Circle
Chantilly, VA 20151

Bank POC: **Jennifer Van Houten**
Principal Environmental Scientist
5300 Wellington Branch Drive, Suite 100
Gainesville, VA 20155
Email: jvanhouten@wetlandstudies.com
Phone: (703) 679-5641
Cell Phone: (703) 615-2462
Fax: (703) 679-5601

Bank Manager: **Ron Stouffer, Jr.**
Environmental Scientist
18139 Triangle Shopping Plaza Ste 213
Dumfries, VA 22026
Email: Ron.H.Stouffer@usace.army.mil
Phone: (757) 201-7124

Credit Type Credit Classifications Assessment Method Available Credits Jurisdiction

Stream	Riverine	Ratio	0.00	Federal
Wetland	Wetlands	Ratio	1.67	Federal

Notes:

Bank Name: 6 - Northern Virginia Stream

Bank Type: Private Commercial

Total Acres:

Distance to impact: 13 Miles

Permit No: NAO-2007-3620

Bank States: Virginia

Comments: An urban stream mitigation bank that utilizes its own credit assessment methodology known as SIAM (Stream Impact Assessment Method)

Bank Sponsor: **Northern Virginia Stream Restoration, LC**
c/o Wetland Studies & Solutions, Inc.
5300 Wellington Branch Drive, Suite 100
gainesville, VA 20151

Bank POC: **Jennifer Van Houten**
Principal Environmental Scientist
5300 Wellington Branch Drive, Suite 100
Gainesville, VA 20155
Email: jvanhouten@wetlandstudies.com
Phone: (703) 679-5641
Cell Phone: (703) 615-2462
Fax: (703) 679-5601

Bank Manager: **Ron Stouffer, Jr.**
Environmental Scientist
18139 Triangle Shopping Plaza Ste 213
Dumfries, VA 22026
Email: Ron.H.Stouffer@usace.army.mil
Phone: (757) 201-7124

Credit Type Credit Classifications Assessment Method Available Credits Jurisdiction

Stream Riverine STREAM 71,062.30 Federal

Notes:

Bank Name: 7 - Red Hill Farm

Bank Type: Private Commercial

Total Acres: 300

Distance to impact: 19 Miles

Permit No: NAO-2007-2803

Bank States: Virginia

Comments: Stream mitigation bank that utilizes the Unified Stream Methodology (USM) to assess credits

Bank Sponsor: **Clearwater Mitigation I LLC**
4704 Rolfe Road
Richmond, VA 23226
Email: jparker@clearwaterventuresllc.com
Phone: (804) 819-0474

Bank POC: **James Parker**
Clearwater Ventures LLC
4704 Rolfe Road
Richmond, VA 23226
Email: jparker@clearwaterventuresllc.com
Phone: (804) 819-0474

Bank Manager: **Ron Stouffer, Jr.**
Environmental Scientist
18139 Triangle Shopping Plaza Ste 213
Dumfries, VA 22026
Email: Ron.H.Stouffer@usace.army.mil
Phone: (757) 201-7124

Credit Type Credit Classifications Assessment Method Available Credits Jurisdiction

Stream Riverine Unified Stream Methodology 224.00 Federal

Notes:

Bank Name: 8 - Rock Hedge

Bank Type: Private Commercial

Total Acres: 252

Distance to impact: 15 Miles

Permit No: NAO-2008-2553

Bank States: Virginia

Comments: Wetland and stream mitigation bank. Credits are assessed using the mitigation ratio method (Wetlands) and Unified Stream Methodology (USM)

Bank Sponsor: **Rock Hedge Mitigation Bank, LLC**
20744 Airmont Rd
Attn: Bradley Gable
Bluemont, VA 20135

Bank POC: **Bradley Gable**
20744 Airmont Road
Bluemont, VA 20135
Email: bradleygable@gmail.com
Cell Phone: (703) 928-5715

David Jordan
Environmental Protection Specialist
18267 Channel Ridge Ct
Leesburg, VA 20176
Email: david@dmjordan.com
Phone: (571) 233-5830
Fax: (703) 669-2729

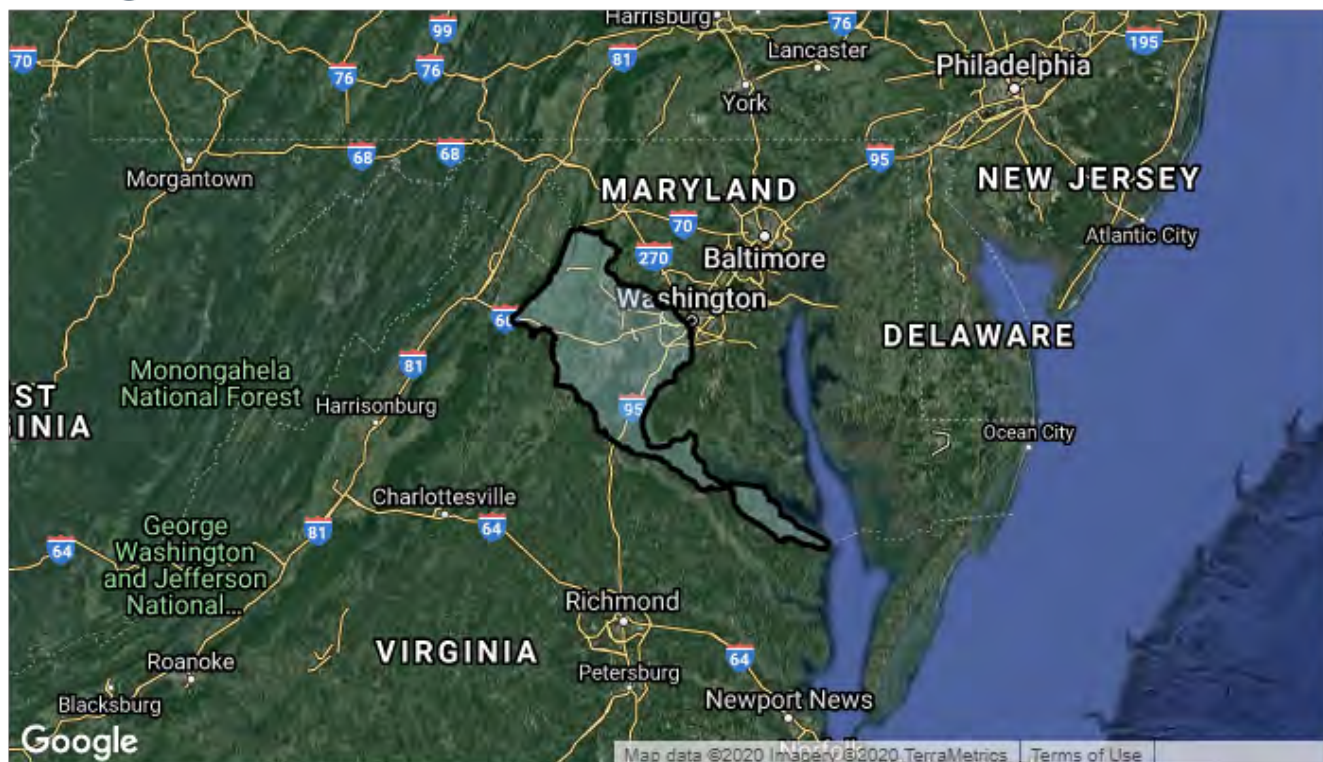
Avi Sareen
TNT Environmental Inc.
13996 Parkeast Circle, Suite 101
Chantilly, VA 20151
Email: avi@tntenvironmentalinc.com
Phone: (703) 466-5123

Bank Manager: **Ron Stouffer, Jr.**
Environmental Scientist
18139 Triangle Shopping Plaza Ste 213
Dumfries, VA 22026
Email: Ron.H.Stouffer@usace.army.mil
Phone: (757) 201-7124

<u>Credit Type</u>	<u>Credit Classifications</u>	<u>Assessment Method</u>	<u>Available Credits</u>	<u>Jurisdiction</u>
Stream	Riverine	Unified Stream Methodology	1,006.00	Federal
Wetland	Wetlands	Ratio	1.45	Federal

Notes:

ILF Program Advance Credits



Program Name: Virginia Aquatic Resources Trust Fund

Program Type: ILF

Distance to impact: 171 Miles

Permit No:

Program States: Virginia

Program Sponsor: The Nature Conservancy of Virginia
490 Westfield Rd
Charlottesville, VA 22901

Program POC: Karen Johnson
Land Protection Specialist
The Nature Conservancy
530 East Main Street, Suite 800
Richmond, VA 23219
Email: karen_johnson@TNC.ORG
Phone: (804) 644-5800 X 116
Fax: (804) 644-1685

Program Manager: Jeanne Richardson
Environmental Scientist
Lynchburg Field Office USACE
PO Box 3160
Lynchburg, VA 24503
Email: jeanne.c.richardson@usace.army.mil
Phone: (434) 384-0182
Fax: (434) 384-7689

Credit Type Service Area Advanced Credits

Non-Tidal	Potomac	40.08
Stream	Potomac	10,000.00
Tidal	Potomac	0.30

Notes:



August 5, 2020

Mr. Avi Sareen
TNT Environmental
13996 Parkeast Circle
Suite 101
Chantilly, Virginia 20151

Re: Credit Availability Letter to Provide Wetland Credits
Loudoun County, Virginia


Dear Mr. Sareen:

We would like to acknowledge that the Cedar Run Wetlands Bank currently has 2.81 wetland credits available for purchase for the above referenced project. They will be reserved when a mutually satisfactory binding contract with a deposit is signed by both parties; until that time, they may be sold to other third parties and will not be reserved in our internal ledgers or RIBITS for the referenced project.

Sincerely,

CEDAR RUN WETLANDS, L.C
a Virginia limited liability company

By:


Jennifer Van Houten, authorized signatory

R:\mitigation banks\mitigation inquiries\TNT\2020-08-05 Credit Availability Letter-Creekmont Project.docx

5300 Wellington Branch Drive • Suite 100 • Gainesville, VA 20155 • Phone 703.679.5641 • Fax 703.679.5601

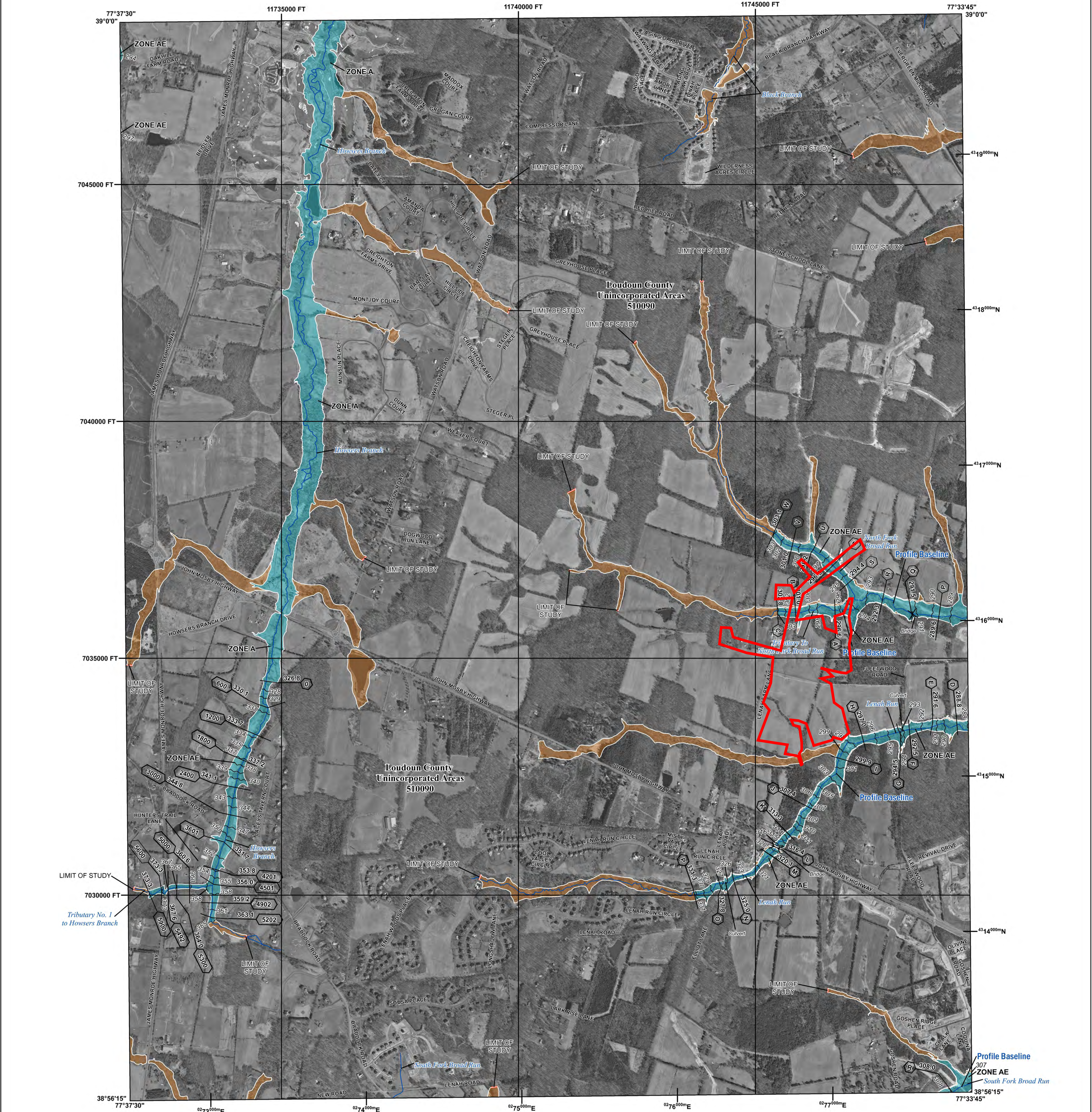
jvanhouten@wetlandstudies.com • www.wetlandstudies.com



Received by VMRC September 3, 2020 /blh

APPENDIX VI

FEMA FLOOD INSURANCE MAP



FLOOD HAZARD INFORMATION

SEE FIS REPORT FOR ZONE DESCRIPTIONS AND INDEX MAP
THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING
DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT
[HTTP://MSC.FEMA.GOV](http://MSC.FEMA.GOV)

SPECIAL FLOOD HAZARD AREAS		Without Base Flood Elevation (BFE) Zone A.V, A99
		With BFE or Depth Zone AE, AO, AH, VE, AR
OTHER AREAS OF FLOOD HAZARD		Regulatory Floodway
		0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
		Future Conditions 1% Annual Chance Flood Hazard Zone X
		Area with Reduced Flood Risk due to Levee See Notes, Zone X
OTHER AREAS		Areas of Minimal Flood Hazard Zone X
		Area of Undetermined Flood Hazard Zone D
GENERAL STRUCTURES		Channel, Culvert, or Storm Sewer
		Accredited or Provisionally Accredited Levee, Dike, or Floodwall
		Non-accredited Levee, Dike, or Floodwall
OTHER FEATURES		Cross Sections with 1% Annual Chance Water Surface Elevation (BFE)
		Coastal Transect
		Coastal Transect Baseline
		Profile Baseline
		Hydrographic Feature
		Base Flood Elevation Line (BFE)
	Limit of Study	
	Jurisdiction Boundary	

NOTES TO USERS

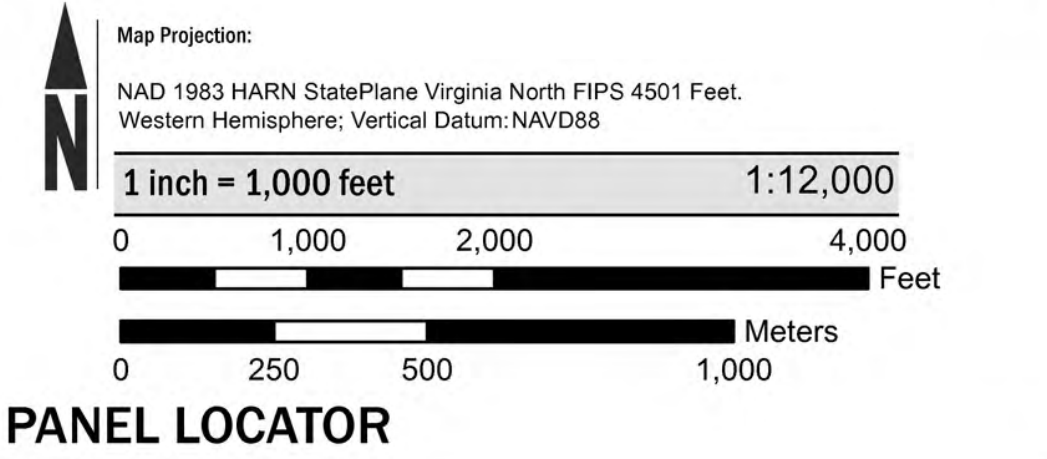
For information and questions about this map, available products associated with this FIRM including historic versions of this FIRM, how to order products or the National Flood Insurance Program in general, please call the FEMA Map Information eXchange at 1-877-FEMA-MAP (1-877-336-2627) or visit the FEMA Map Service Center website at <http://msc.fema.gov>. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the website. Users may determine the current map date for each FIRM panel by visiting the FEMA Map Service Center website or by calling the FEMA Map Information eXchange.

Communities annexing land on adjacent FIRM panels must obtain a current copy of the adjacent panel as well as the current FIRM Index. These may be ordered directly from the Map Service Center at the number listed above.

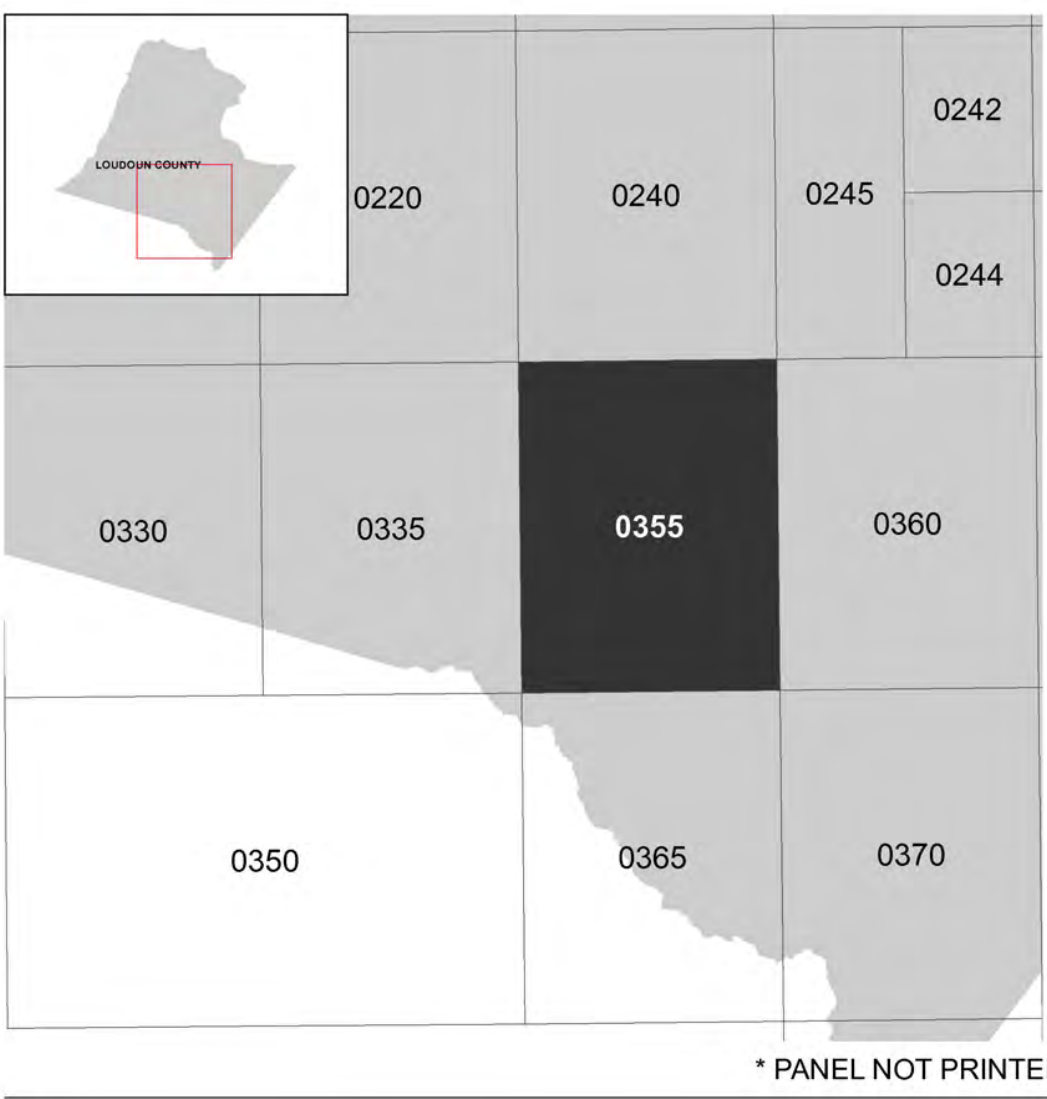
For community and countywide map dates refer to the Flood Insurance Study report for this jurisdiction. To determine if flood insurance is available in the community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

Base map information shown on this FIRM was provided in digital format by Loudoun County and was collected by Sanborn Map Company. This information was photogrammetrically compiled at a scale of 1:2,400 from aerial photography dated 2012.

SCALE



PANEL LOCATOR



FEMA
National Flood Insurance Program

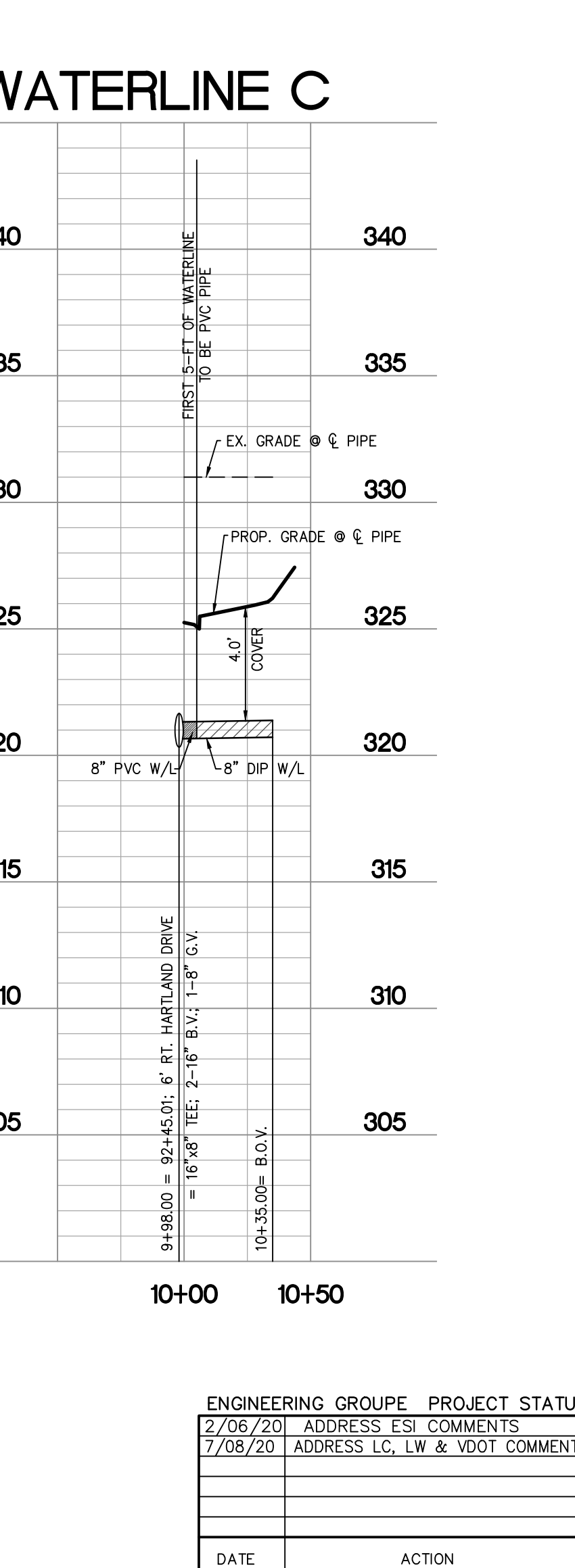
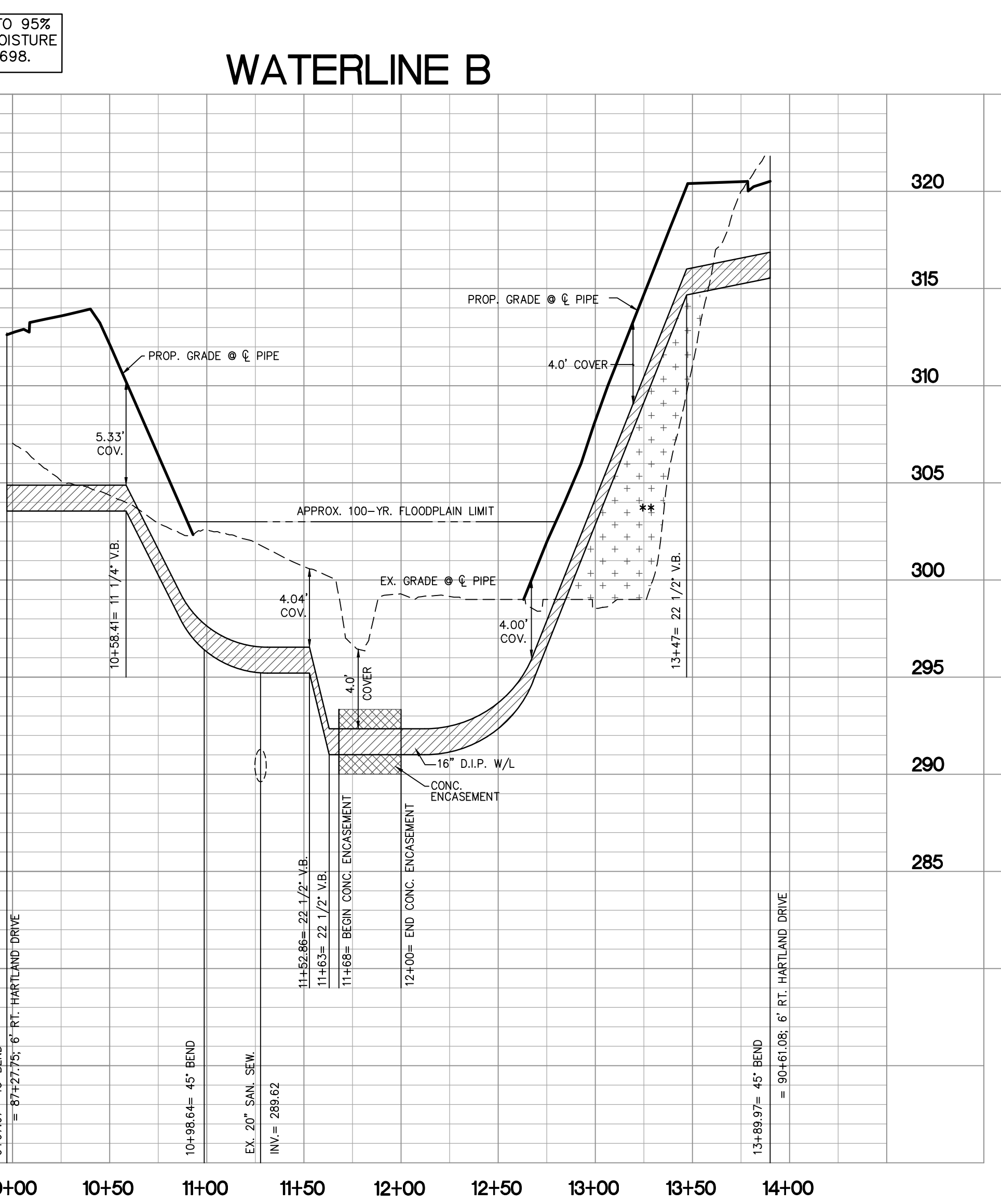
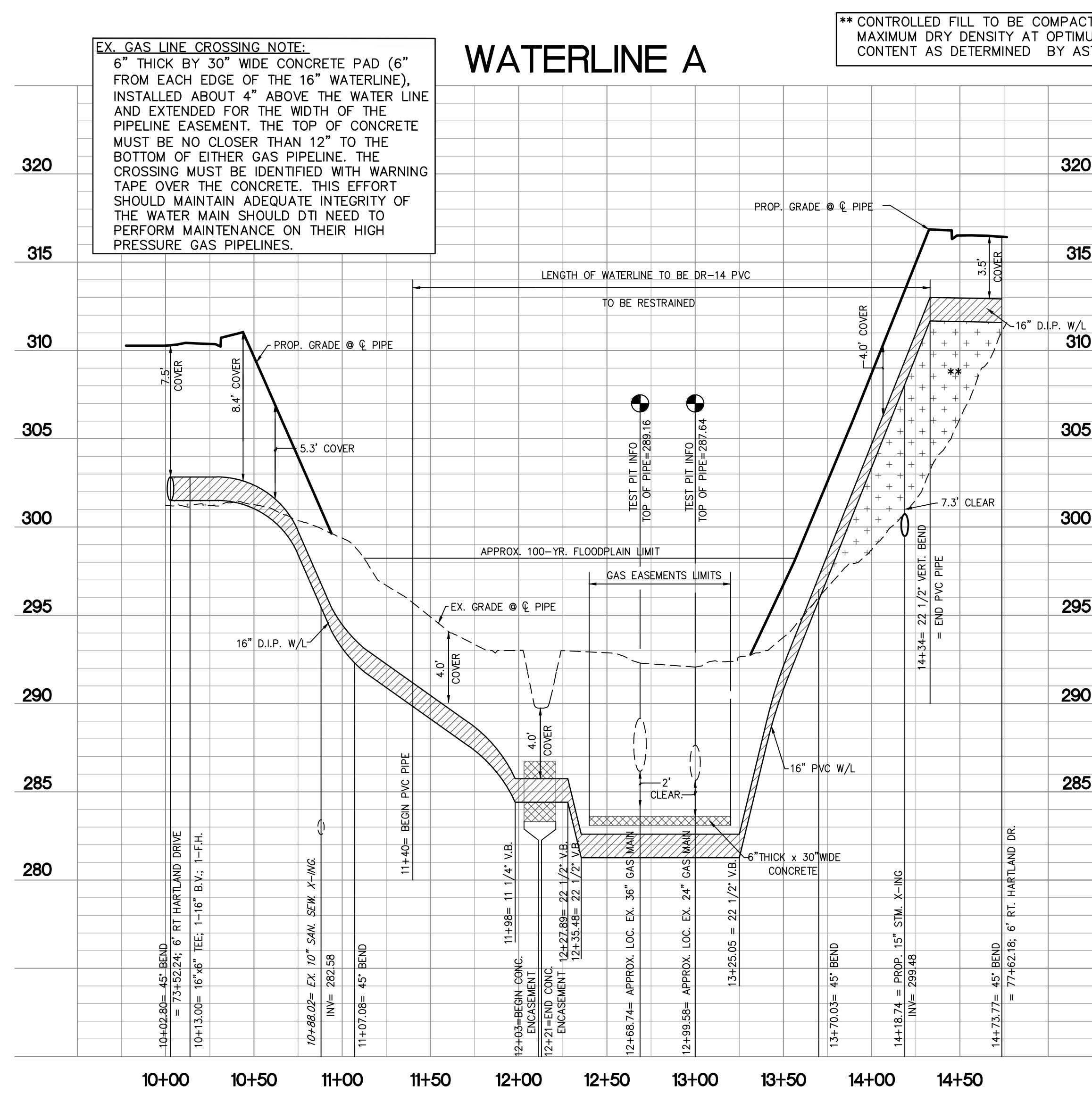
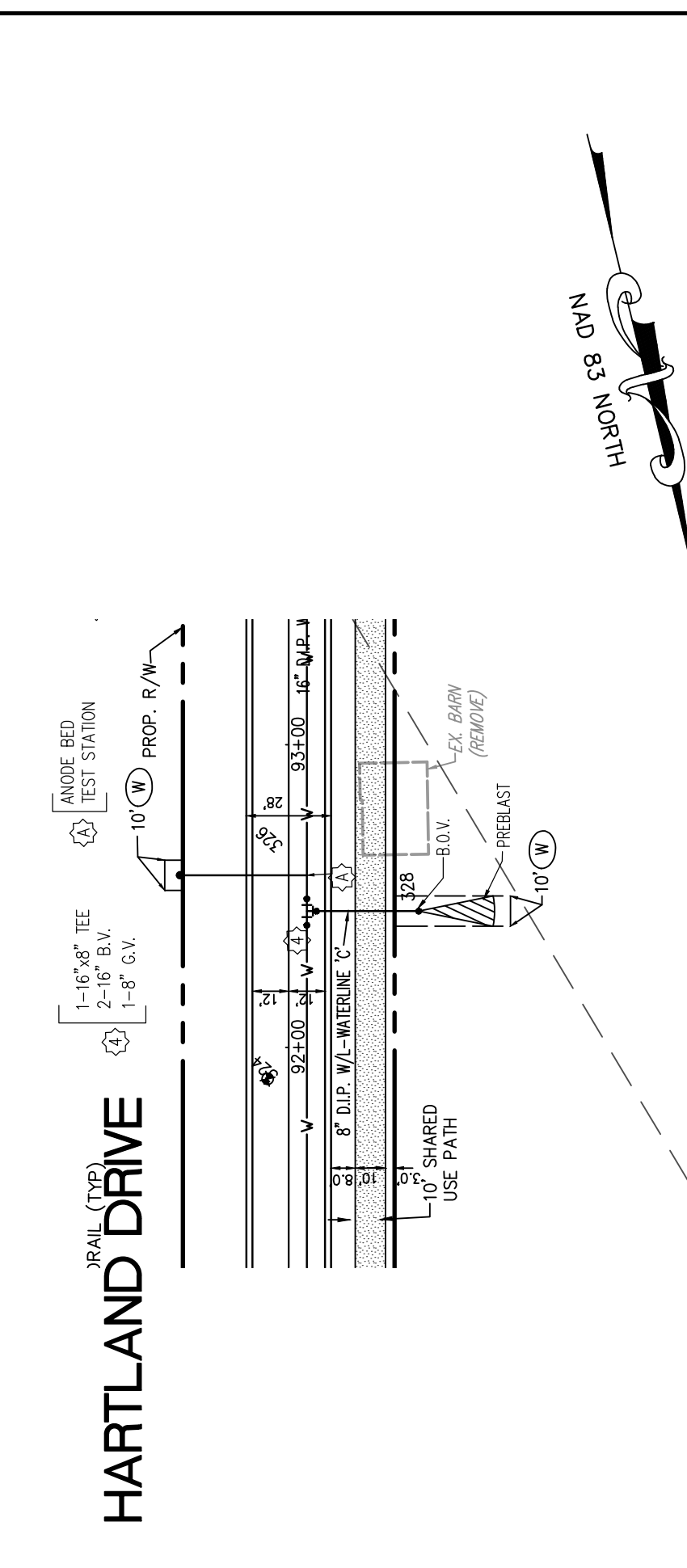
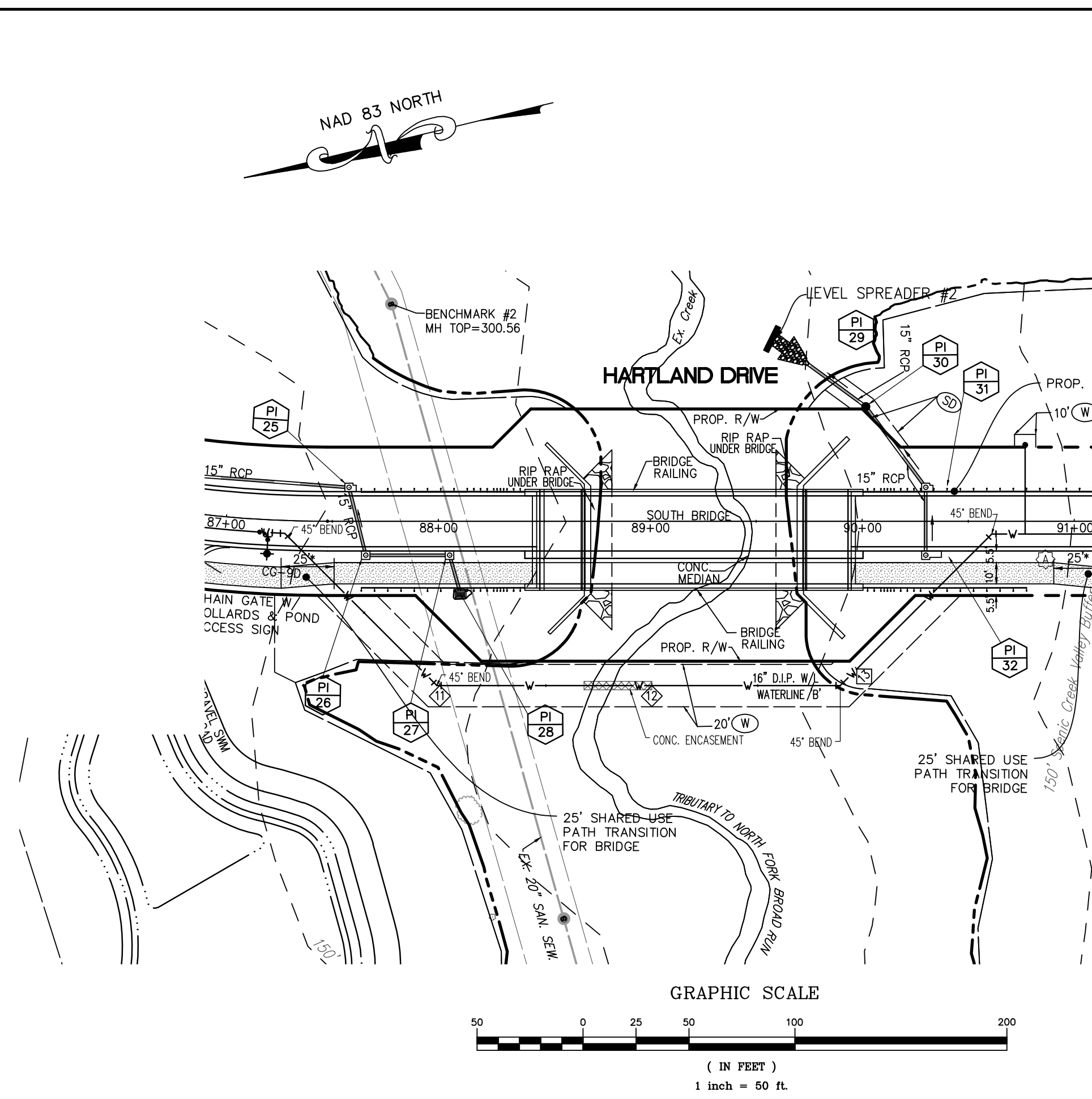
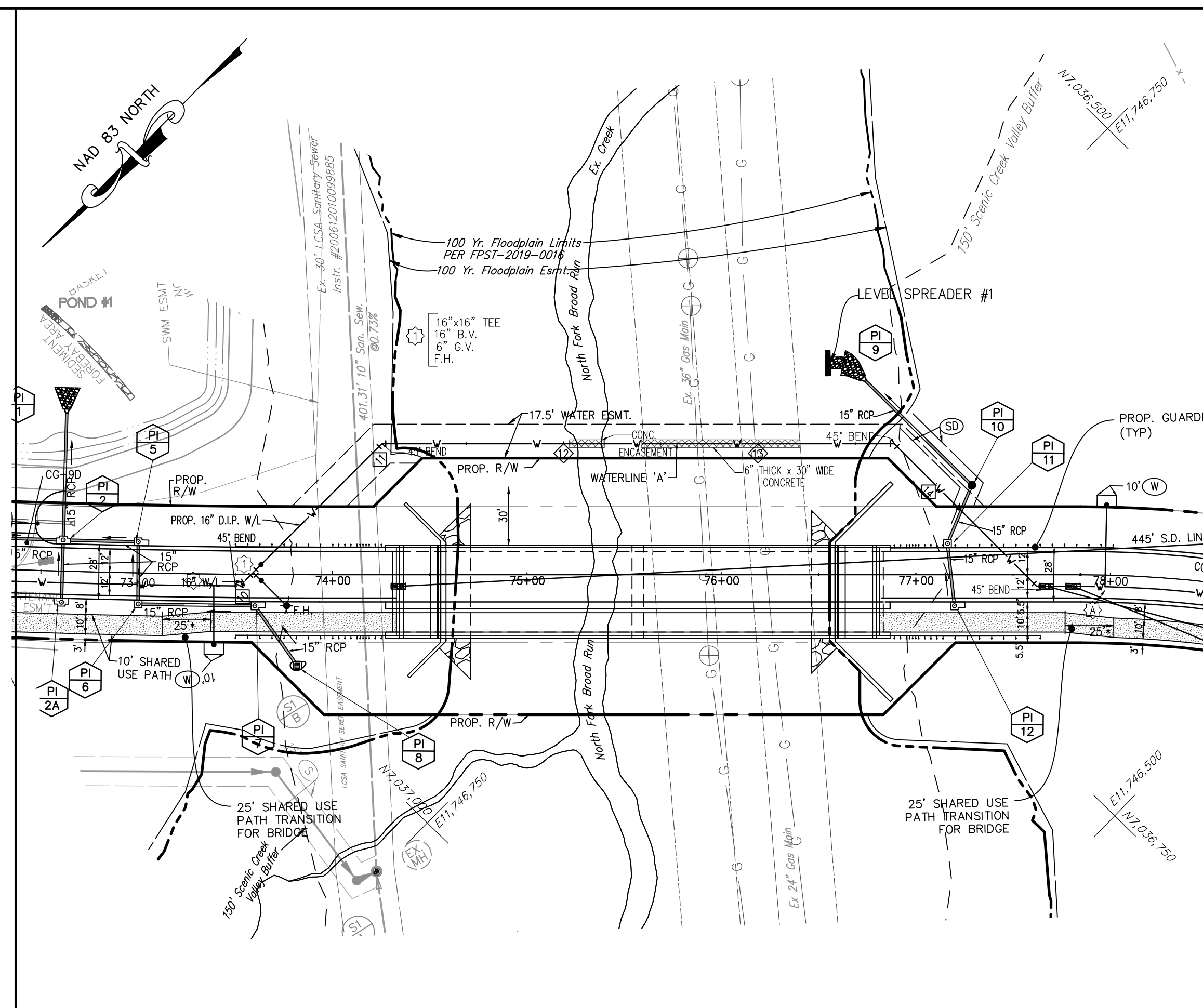
NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP

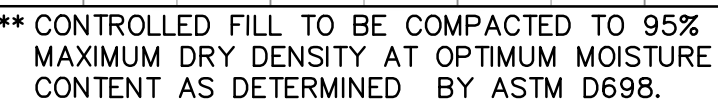
LOUDOUN COUNTY, VIRGINIA
And Incorporated Areas
PANEL 355 OF 2982

Panel Contains:
COMMUNITY NUMBER PANEL SUFFIX
LOUDOUN COUNTY 510090 0355 E

VERSION NUMBER
2.3.3.2
MAP NUMBER
51107C0355E
MAP REVISED
FEBRUARY 17, 2017

APPENDIX VII
CROSS SECTIONAL DIAGRAMS

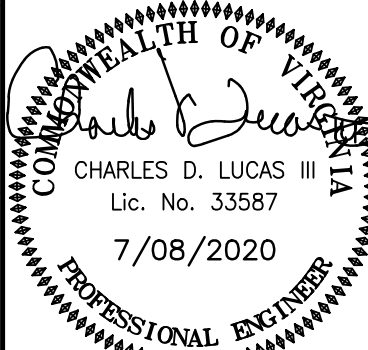
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STORM SEWER PROFILES

HARTLAND NORTH
HARTLAND DRIVE - PHASES 1A & 1B

**BLUE RIDGE ELECTION DISTRICT
LOUDOUN COUNTY, VIRGINIA**



DATE:	DECEMBER, 2019
SCALE:	HORIZ: 1"=50' VERT: 1"=5'
DESIGNER:	RAP,CF,JP,MC,PA,JP
DRAFT:	JP,MC,PA,JE,YQ
FILE NO.	PP-257
SHEET	12 OF 35

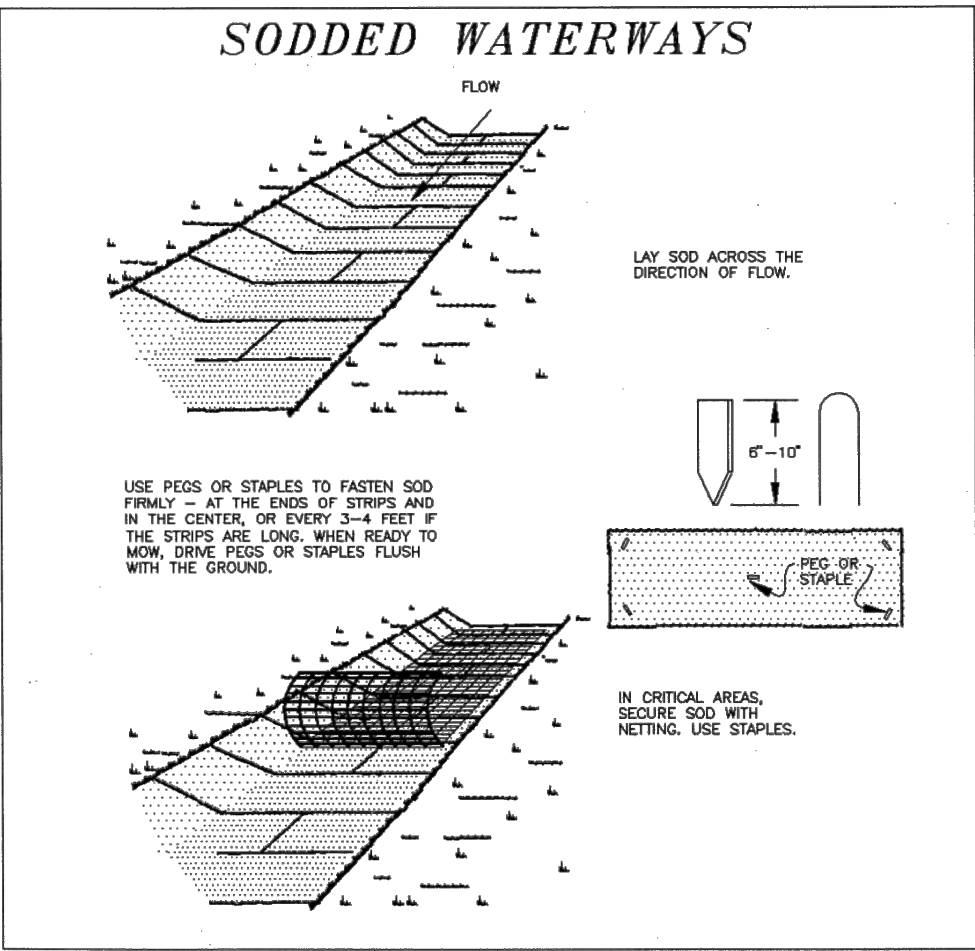
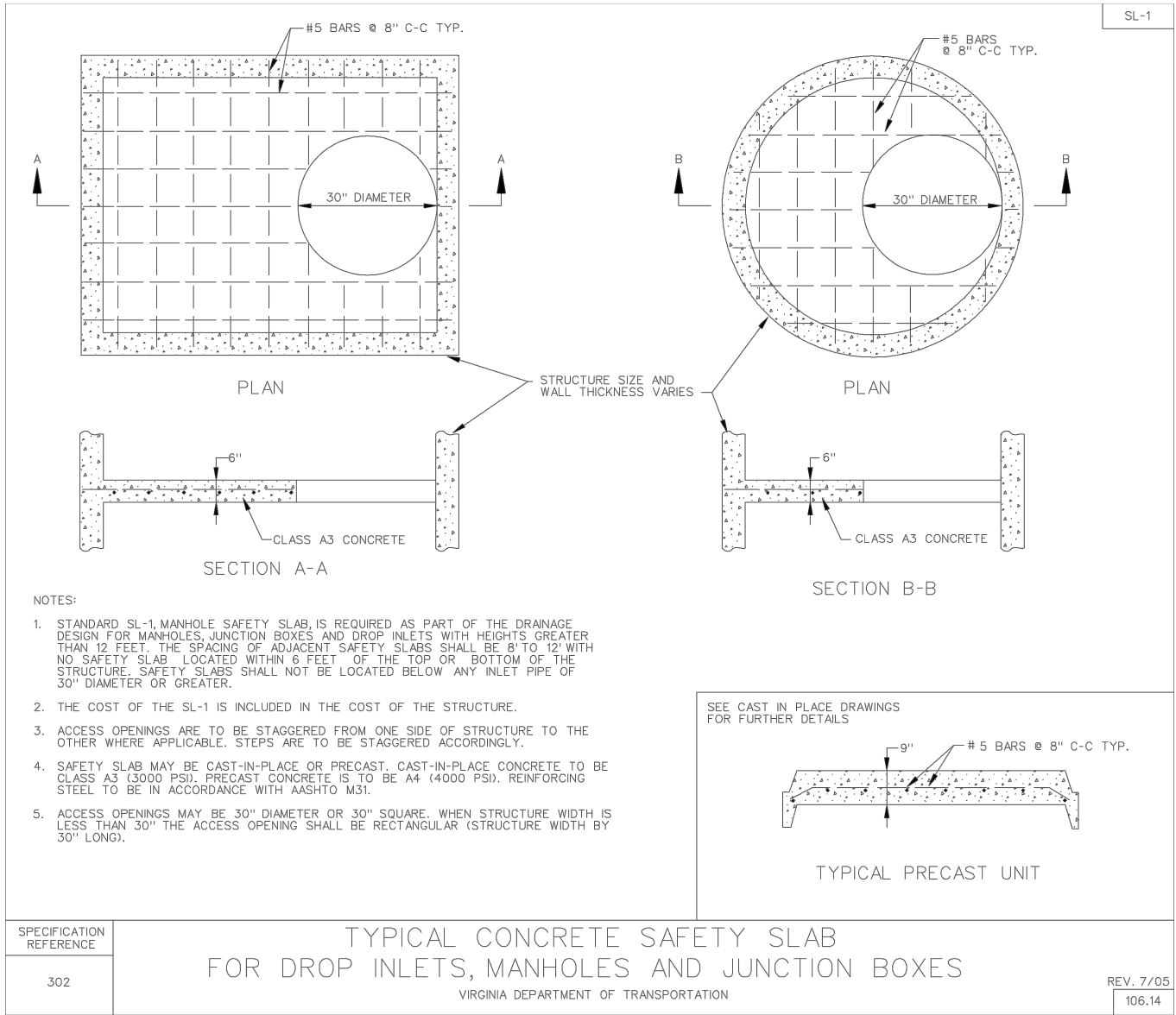
The Engineering Group
Inc.
Engineers | Surveyors | Planners
www.engingroupe.com

Central Office
 10333 Southpointe Drive, Suite 200
 Fredericksburg, VA 22192
 P.O. 703.670.0095

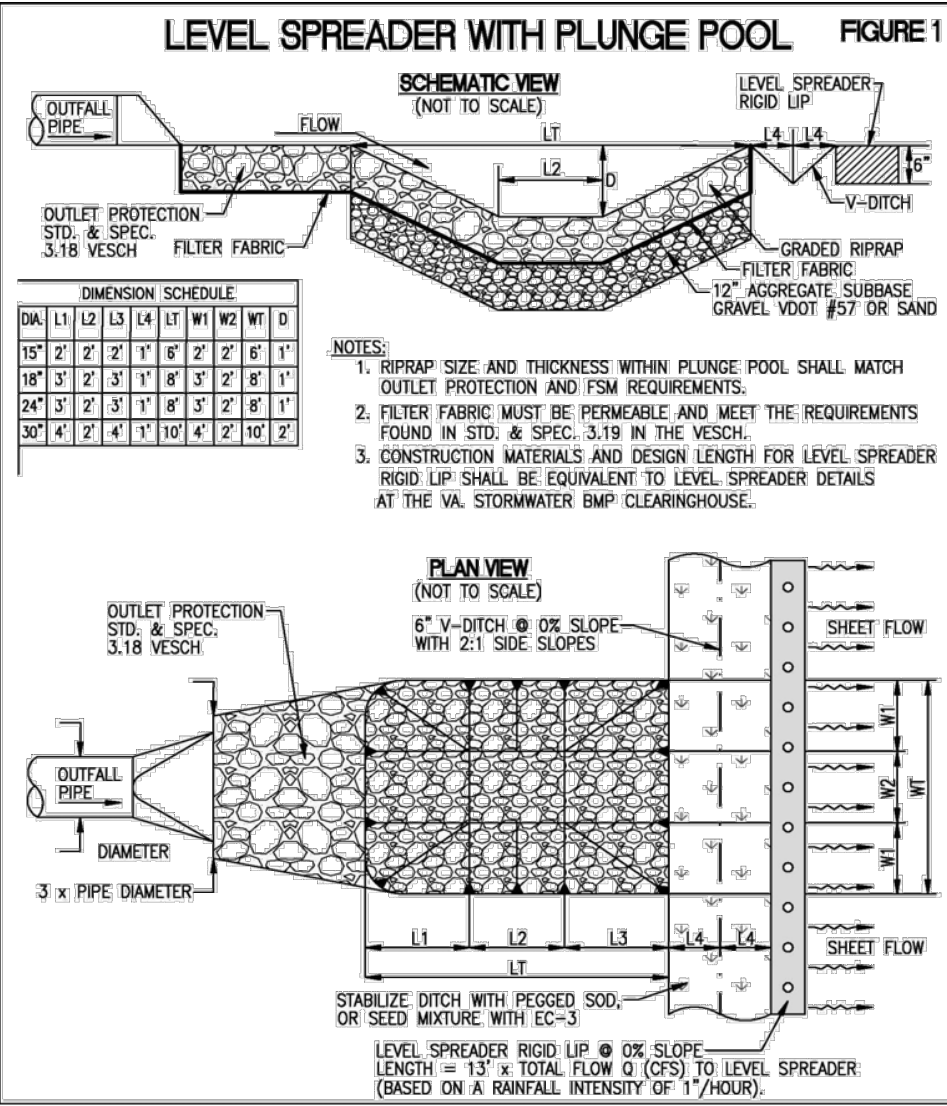
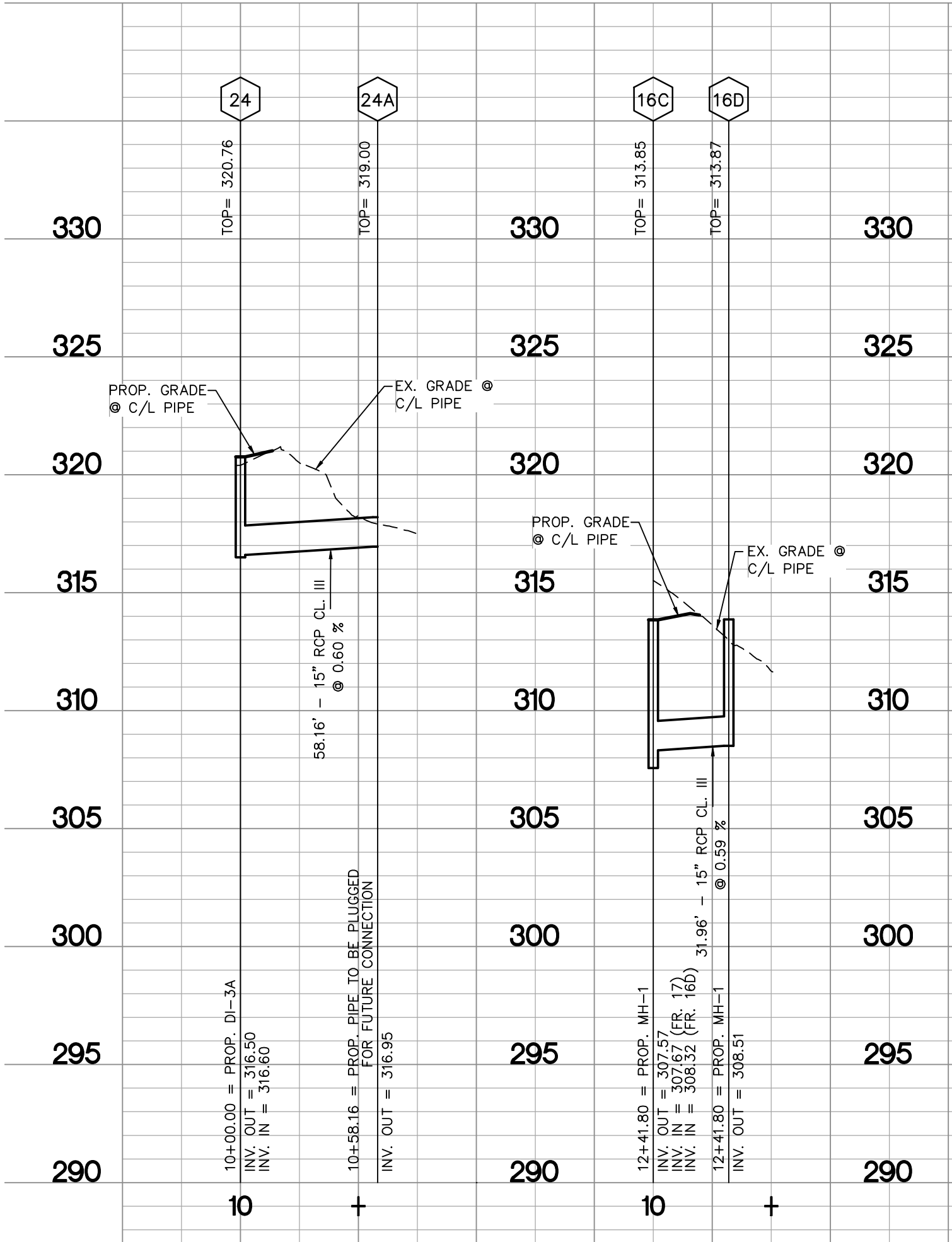
South Office
 10333 Southpointe Landing Blvd, Suite 121
 Fredericksburg, VA 22407
 P.O. 703.670.0095

West Office
 21001 Sycolin Road, Suite 200
 Ashburn, VA 20147
 P.O. 703.670.0095

[illegible]



Source: Va. DSWC Plate 3.33-2
NOTE: ALL SOD MUST BE PROPERLY PREPARED AND INSTALLED AS PER STD. & SPEC. 3.33 IN THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK. (FSM 5.200)



ENGINEERING GROUPE PROJECT STATUS

2/06/20	ADDRESS ESI COMMENTS
7/08/20	ADDRESS LC, LW & VDOT COMMENTS
DATE	ACTION

STORM SEWER PROFILES

HARTLAND NORTH
HARTLAND DRIVE - PHASES 1A & 1B
BLUE RIDGE ELECTION DISTRICT
LOUDOUN COUNTY, VIRGINIA



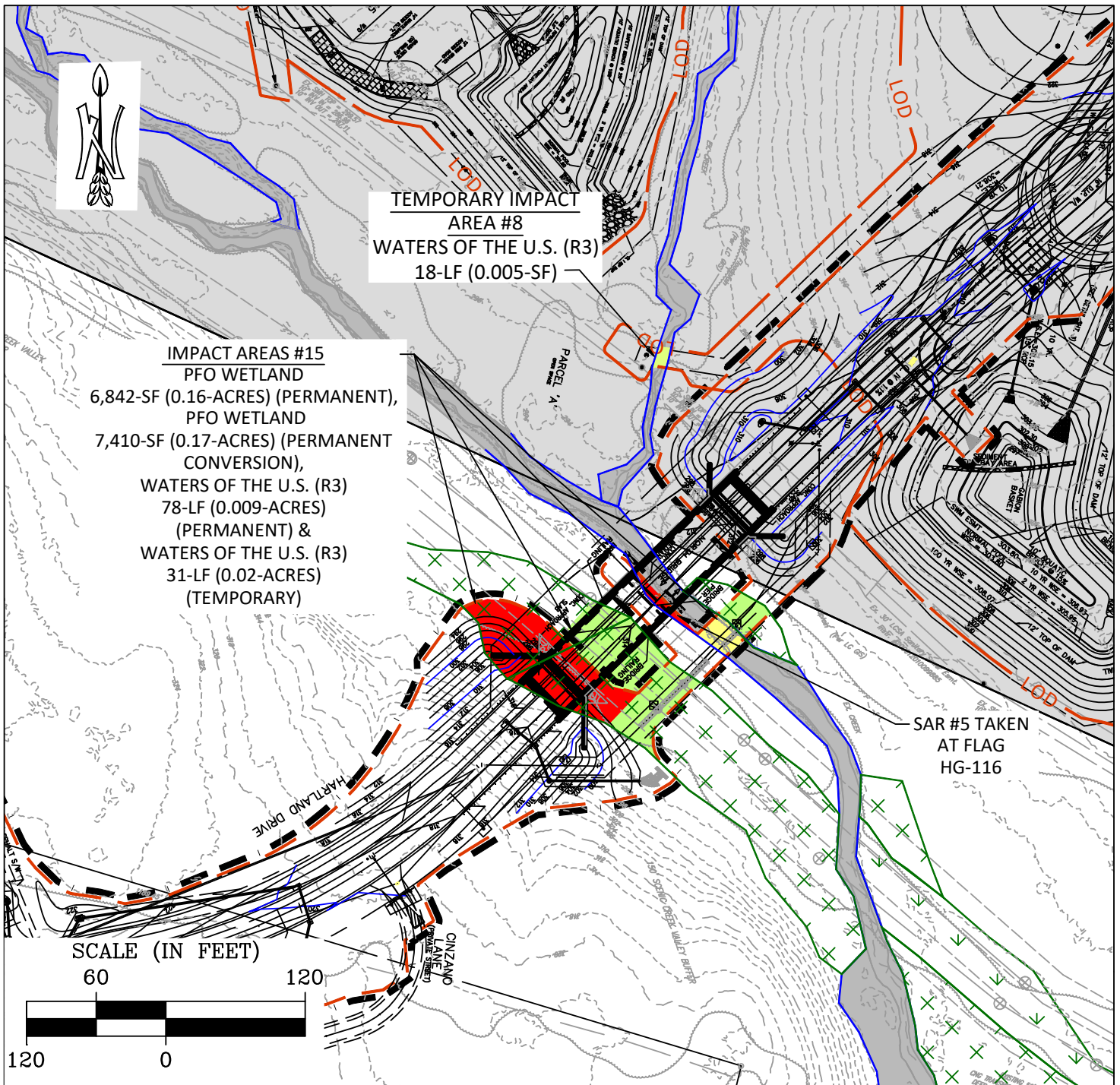
DATE: DECEMBER, 2019

SCALE:	HORIZ: 1"=50'
	VERT: 1"=5'
DESIGNER:	RAP,CF,JP,MC,PA,JE
DRAFT:	JP,MC,PA,JE,YQ
FILE NO.	PP-257
SHEET 12A	OF 35

The Engineering Groupe Inc.
Engineers | Surveyors | Planners
www.enggroupe.com
Central Office: 13580 Grange Drive Suite 200
Woodbridge, VA 22192
PH 703.670.0985
West Office: 21001 Sorbin Road Suite 200
Ashburn, VA 20147
PH 703.670.0985

APPENDIX VIII

8.5 X 11" DRAWINGS



JOINT PERMIT APPLICATION

HARTLAND PHASE II

LOUDOUN COUNTY, VA

AUGUST 2020



ENVIRONMENTAL

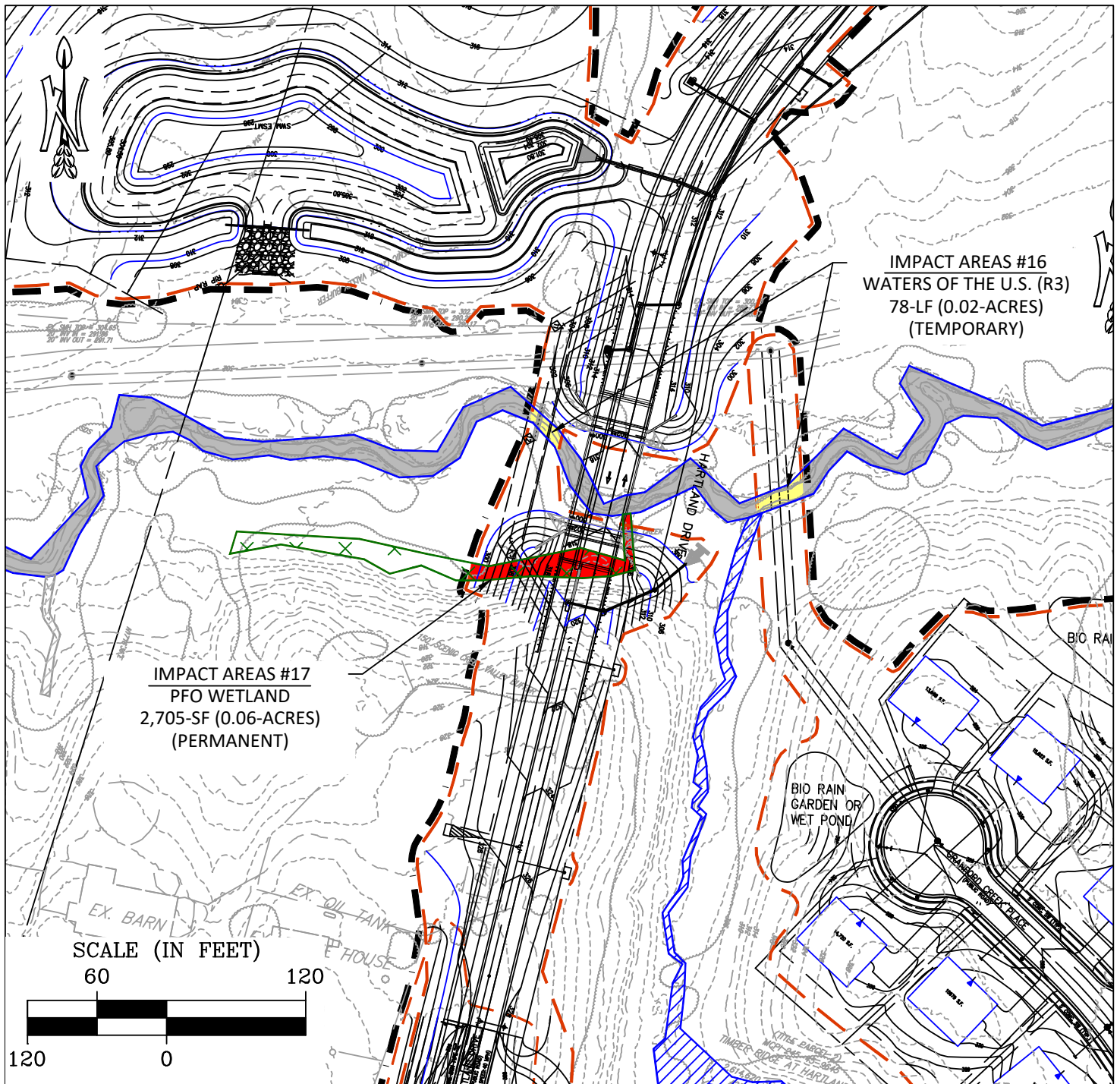
**4455 BROOKFIELD
CORPORATE DRIVE
SUITE 100**

CHANTILLY, VIRGINIA 20151

PLAN VIEW

IMPACT #15
PFO WETLAND (PERMANENT
& PERMANENT CONVERSION),
WATERS OF THE U.S. (R3)
(PERMANENT) &
WATERS OF THE U.S. (R3)
(TEMPORARY)

TNT PROJECT NO: 1460-F1



JOINT PERMIT APPLICATION

HARTLAND PHASE II

LOUDOUN COUNTY, VA

AUGUST 2020

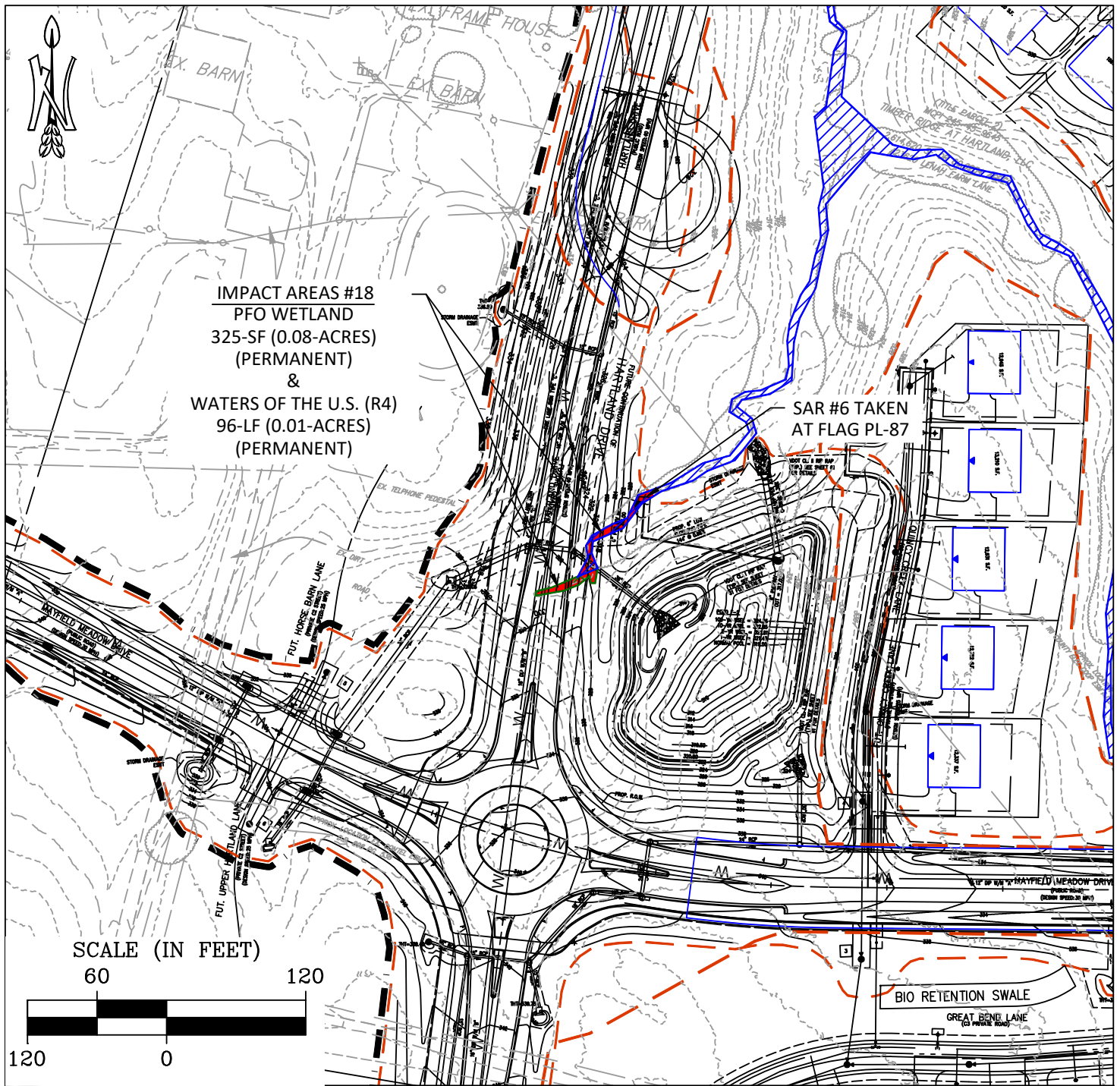


ENVIRONMENTAL
4455 BROOKFIELD
CORPORATE DRIVE
SUITE 100
CHANTILLY, VIRGINIA 20151

PLAN VIEW

IMPACT #16 & 17
PFO WETLAND (PERMANENT)
&
WATERS OF THE U.S. (R3)
(TEMPORARY)

TNT PROJECT NO: 1460-F1



JOINT PERMIT APPLICATION

HARTLAND PHASE II

LOUDOUN COUNTY, VA

AUGUST 2020

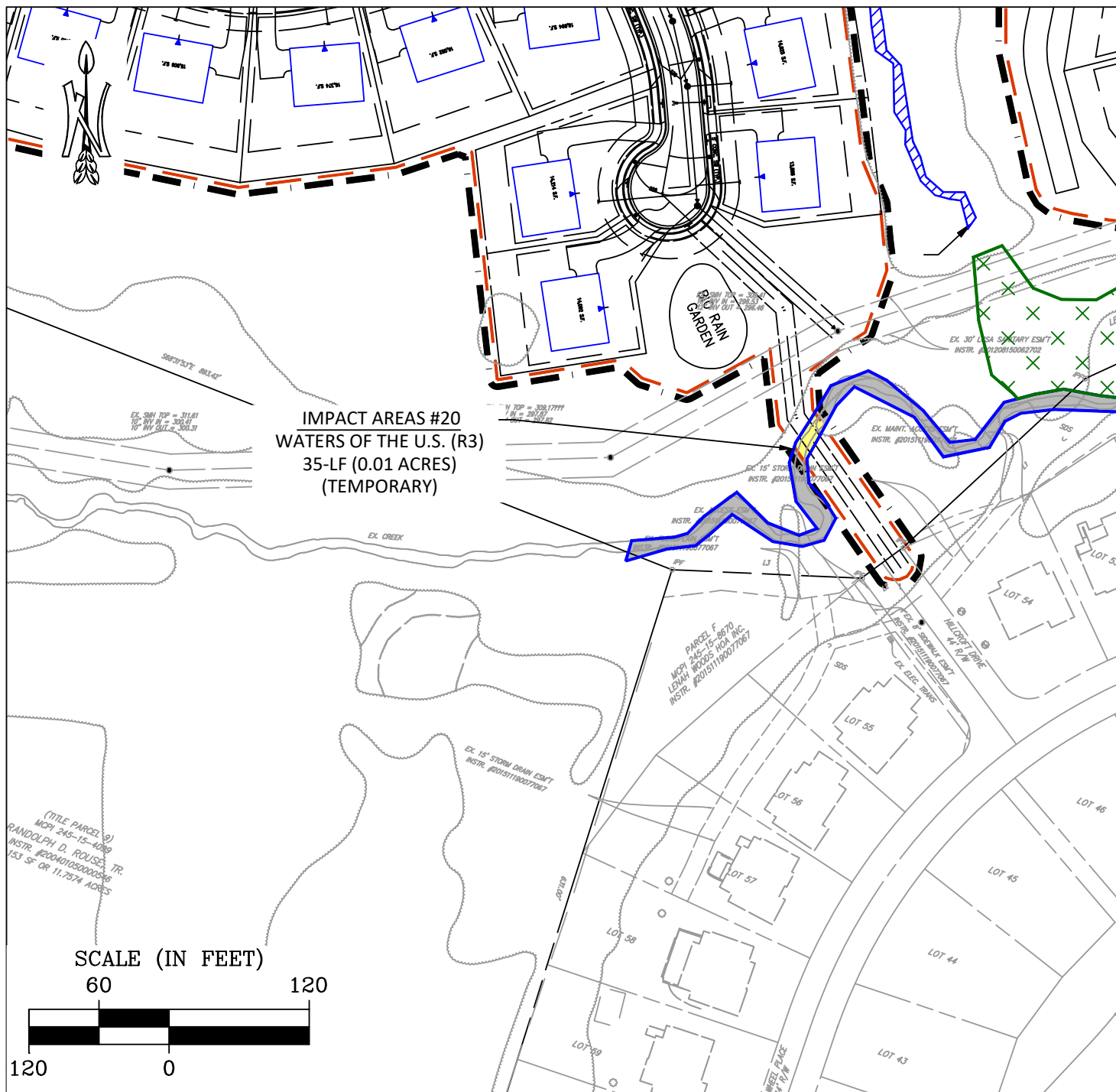


ENVIRONMENTAL
 4455 BROOKFIELD
 CORPORATE DRIVE
 SUITE 100
 CHANTILLY, VIRGINIA 20151

PLAN VIEW

IMPACT #18
PFO WETLAND (PERMANENT)
 &
WATERS OF THE U.S. (R4)
 (PERMANENT)

TNT PROJECT NO: 1460-F1



JOINT PERMIT APPLICATION

HARTLAND PHASE II

LOUDOUN COUNTY, VA

AUGUST 2020



ENVIRONMENTAL

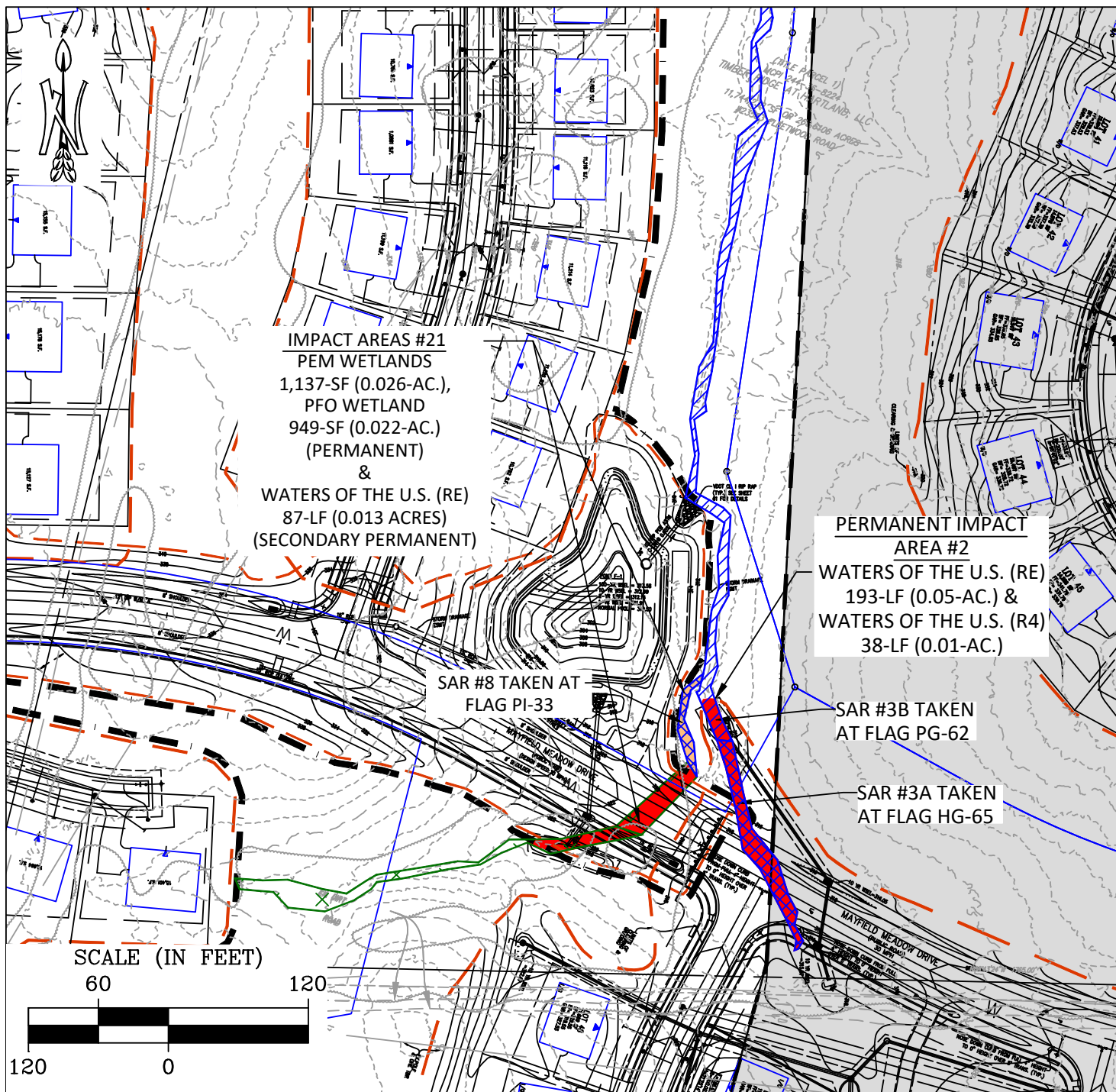
**4455 BROOKFIELD
CORPORATE DRIVE
SUITE 100**

CHANTILLY, VIRGINIA 20151

PLAN VIEW

**IMPACT #20
WATERS OF THE U.S. (R3)
(TEMPORARY)**

TNT PROJECT NO: 1460-F1



JOINT PERMIT APPLICATION

HARTLAND PHASE II

LOUDOUN COUNTY, VA

AUGUST 2020

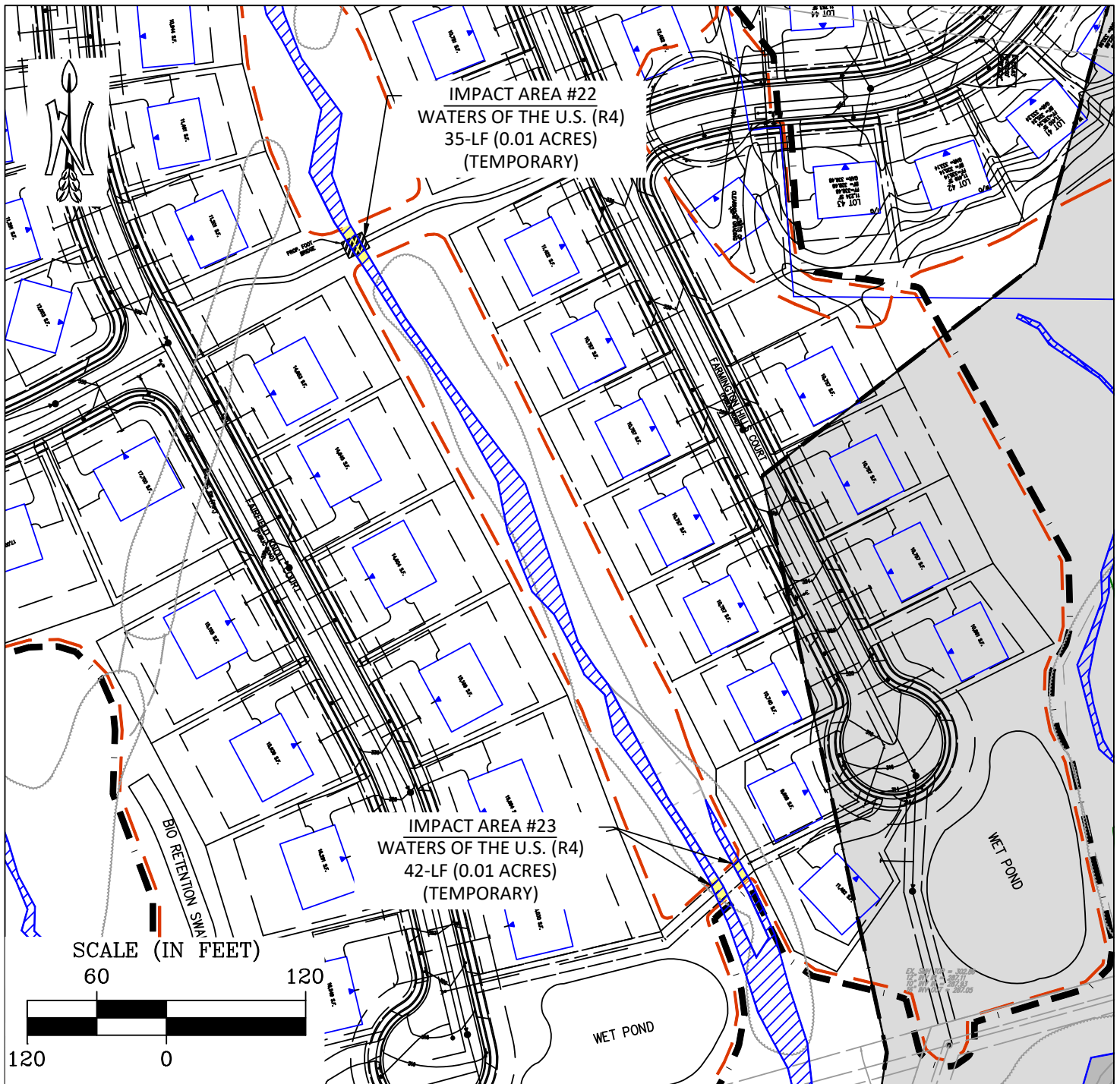


ENVIRONMENTAL
 4455 BROOKFIELD
 CORPORATE DRIVE
 SUITE 100
 CHANTILLY, VIRGINIA 20151

PLAN VIEW

IMPACT #21
 PFO WETLAND & PEM
 WETLAND (PERMANENT) &
 WATERS OF THE U.S. (RE)
 (SECONDARY PERMANENT)

TNT PROJECT NO: 1460-F1



JOINT PERMIT APPLICATION

HARTLAND PHASE II

LOUDOUN COUNTY, VA

AUGUST 2020

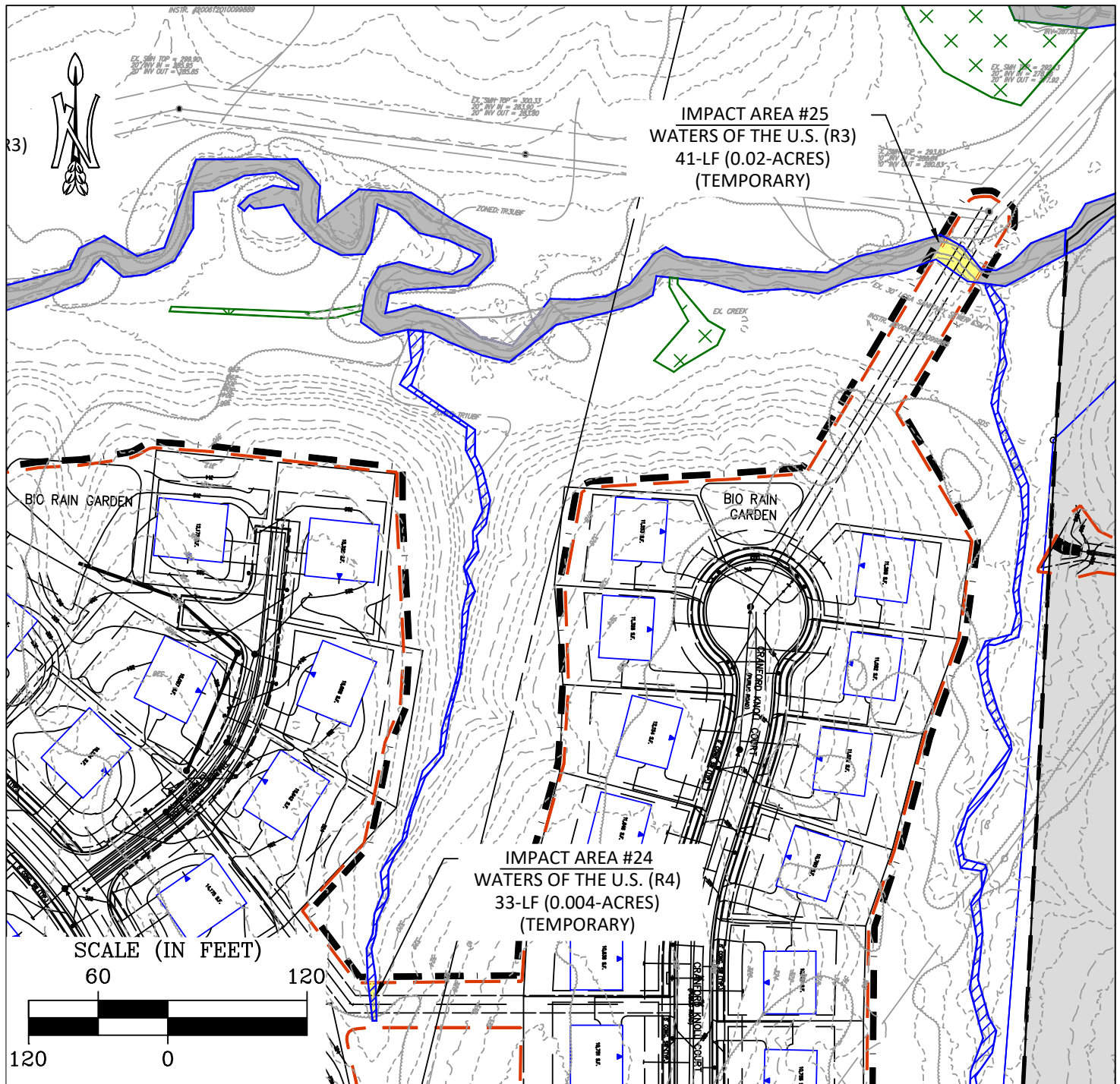


ENVIRONMENTAL
4455 BROOKFIELD
CORPORATE DRIVE
SUITE 100
CHANTILLY, VIRGINIA 20151

PLAN VIEW

IMPACT #22 & 23
WATERS OF THE U.S. (R4)
(TEMPORARY)

TNT PROJECT NO: 1460-F1



JOINT PERMIT APPLICATION

HARTLAND PHASE II

LOUDOUN COUNTY, VA

AUGUST 2020



ENVIRONMENTAL
4455 BROOKFIELD
CORPORATE DRIVE
SUITE 100
CHANTILLY, VIRGINIA 20151

PLAN VIEW

IMPACT #24 & 25
WATERS OF THE U.S. (R4)
(TEMPORARY) & WATERS OF
THE U.S. (R3)
(TEMPORARY)

TNT PROJECT NO: 1460-F1

